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TPG

editorial

TONY SARNO

I may have played a big part in highlighting the security holes of unsecured home Wi-Fi networks. It may seem far-fetched, but I experienced the following first-hand. A couple of months ago, I received an automated email response from an established news web site, thanking me for my submission to the site's feedback area.

I was surprised, because I hadn't submitted anything, and I was even more surprised when I read what it was: effectively a bomb threat combined with a demand. It seemed such a preposterous hoax that I didn't take it seriously. But, just in case, I rang the editor of the site and assured him it wasn't me and forgot about it.

About a month later I got a call from the police, asking why I'd sent threatening emails to another couple of places. When the Sergeant put on his best police interrogation voice, I realised this wasn't a joke and I was actually a terrorism suspect. Even when he relented and made it obvious he didn't think the editor of *APC* magazine would be stupid enough to use his own work email to send threatening emails, I was still unnerved, and thinking furiously how the emails with the obviously spoofed address could be traced to their source.

The Police Dept were thinking the same thing and eventually traced their origins to computers at a series of private Australian addresses. According to the police, all the people living in the private addresses were using unsecured Wi-Fi networks at home. The offender had allegedly tapped into their connections from the street and used a mobile device to send his threatening emails.

The man has now been charged. I always assumed that if you connected to the net via an unsecured Wi-Fi network it would be virtually impossible to trace it back to you, or at least, tie you to the scene. But that is now a question for the courts.

This episode left me impressed by the thoroughness of the police — which brings us to the story on page 14 on how police can find data on people's computers and other devices. The story explains how overwriting, deleting, and shredding data on a PC may still not be enough to prevent investigators retrieving it. It seems that the only way to truly prevent someone (with enough resources and time) from accessing data is to actually shred the drive itself, which is apparently what some security agencies do when dumping old computers.

Our cover story on the hottest techs of 2008 shows we're in for an exciting year. Some massive releases are coming up. Apple's iPhone will undoubtedly sweep all before it, and Microsoft's Windows Server 2008 will be seismic in the backends of business — not to mention the rollouts of CPUs from Intel and AMD. Let 2008 roll on!

WHEN THE SERGEANT PUT ON HIS BEST POLICE INTERROGATION VOICE, I REALISED THIS WASN'T A JOKE

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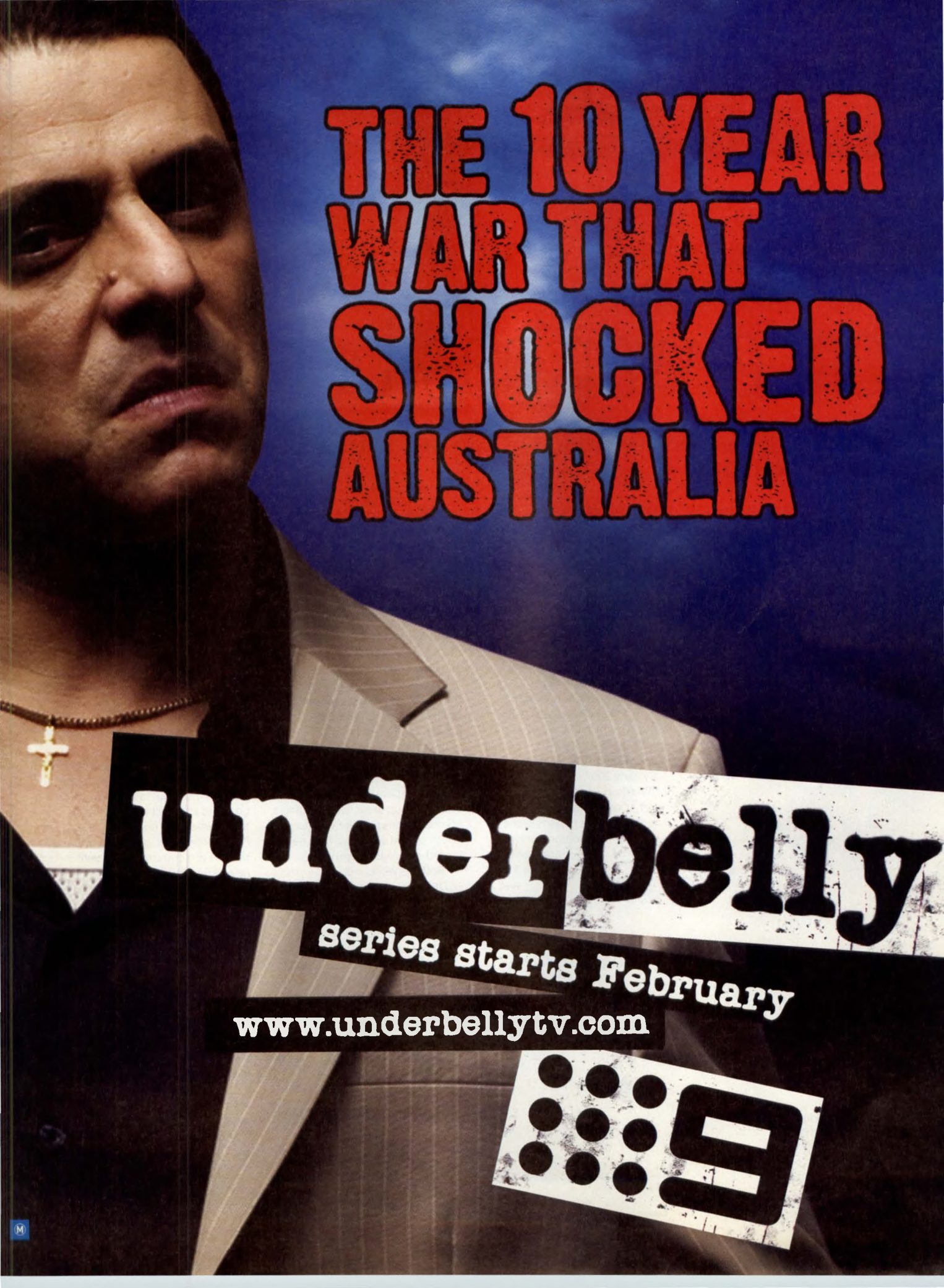
***APC*'s Highly Recommended award is bestowed upon products that are of great overall quality.**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Mobile broadband price war has begun

Get set for lower-than-ever prices and souped-up speeds as carriers slug it out for your wireless dollar, reports *David Flynn*.

With notebooks sales easily outpacing desktops, and ADSL connections reaching into the majority of internet-connected homes, the industry has trained its sights on a new target: mobile broadband.

As this issue went to print, Vodafone and 3 — the younger and more aggressive of the mobile telcos — were trading blows in an effort to woo new wireless customers onto their HSDPA 3.6 3G networks.

Vodafone's salvo introduced a 5GB plan costing just $39 per month, representing five times the downloads of its previous 1GB monthly plan but at almost half the price.

3 responded by halving the price on all its mobile broadband plans, which saw the cost of 1GB plummet to $14.50 per month for users with a 3 mobile phone. Non-bundled deals dropped to $24.50 for 2GB, $34.50 for 3GB and $49.50 for 5GB.

And while prices have been falling, connection speeds are on the rise. This time two years ago the mobile phone networks of 3, Optus and Vodafone were stuck at the 384Kbit/s downlink rate of plain vanilla 3G, which in the real world typically meant 250Kbit/s — barely on par with entry level ADSL.

By early 2007, the rollout of HSDPA (High Speed Download Packet Access) had shifted the red-line to 1.8Mbit/s in parts of the Vodafone network, and 3.6Mbit/s for 3 as well as Telstra's shiny new Next G network. The last six months saw Optus and Vodafone both carry out network-wide upgrades to HSDPA 3.6 bandwagon, while Telstra upped the ante on Next G to 7.2Mbit/s.

Typical download speeds on the 3.6 3G networks are between 600Kbit/s and 1.5Mbit/s with peaks of 2Mbit/s, while Next G customers can download up to 3Mbit/s.

But the wireless wars won't stop there. Vodafone has pledged to build a national mobile broadband network by the end of 2008, capable of delivering 14.4Mbit/s to 95% of the population.

This will include an expansion of 3G base stations in major cities and other built-up areas, and building a 3G overlay onto part of Vodafone's 900MHz GSM spectrum for a new long-throw regional service.

Both networks will use 14.4Mbit/s HSDPA, with the current 2,100MHz 3G service initially being stepped up to 7.2Mbit/s and then 14.4Mbit/s by year's end. Along the way, a dedicated 2Mbit/s uplink channel will be added using HSUPA, which is the upstream equivalent of HSDPA. "When we go to 7.2 we'll (also) have a 2Mbit/s HSUPA uplink" Gareth Simmons, Technology Business Manager for Vodafone Australia, told *APC*.

Andy Reeves, Chief Technology Officer at Vodafone Australia, says that the new dual-band system will put 95% of Australia's population under the wing of a single mobile broadband service. He is quick to point out that Vodafone isn't closing its GSM service. "We're not switching anything off. All the handsets will still work, and if you're a current 2G customer you'll get exactly the same (coverage) as today".

"But if you're a 3G customer and you've currently got 55% coverage, and you flick back to 2G when you go out of that 55% coverage zone, that's what were upgrading (to 3G). People who want mobile broadband outside of a current 3G area will need a new handset or modem to access the 3G overlay on 900MHz".

While both the 3G-grade 2,100MHz and 900MHz networks will run in parallel, they won't be operating in the same areas, despite the superior ability of the 900MHz signals to soak through walls and travel deeper into buildings and car parks than 2,100MHz.

"From an operator perspective 900 is better at covering longer distances, and 2,100 is better at handling lots and lots of users" Reeves explains, "so we'll selectively roll out those separate frequencies as required. For more densely-populated areas we'll roll out 21, and the less densely-populated areas we'll roll out at 900".

Vodafone will upgrade its 3G HSDPA network to 14.4Mbit/s this year.

DX10 IN CRYSIS

A year down the line, have we seen what we expected from DX10?

DirectX 10 might not be all it's cracked up to be. There are still gaming performance issues in Windows Vista, and understandably gamers are wary of swapping their perfectly functional gaming setup in XP for the sort of performance hit they are going to take switching to Microsoft's latest OS. The big question, of course, is whether there's enough of a visual boost to justify running DX10 over DX9, and as yet the bells and whistles in the few DX10 titles currently available simply don't offer it.

Or should that be smoke and mirrors? The supposed 'killer app' for DirectX 10 was meant to be Crysis, Crytek's sequel to classic FPS Far Cry. The game has been hyped since its announcement as the first real DX10 game and the screenshots showing the incredible differences between the new API and DX9 were thoroughly impressive. A short time after the release of the single-player demo of Crysis, however, it became evident that the DX9 version had been significantly hobbled, possibly so that the DX10 version would stand out more.

The 'Very High' graphical detail setting in the game's options are greyed out in XP, only becoming available under Vista when a DX10 card is detected. Like the PhysX debacle before it – where it turned out that the sludgy goo produced by Ageia's card was easily reproduced without it – this turned out to be an artificial separation. With a simple config file tweak you could run all the main DX10 features under XP that Microsoft, EA and Crytek have been trumpeting for the entire length of the game's development. We are assured there are subtle differences that we aren't seeing between the two graphics pathways – even with the hack in action – but surely that goes against the point. If all this technology was really necessary then we should be able to see the results of it being there.

Still, this is just the current state of DirectX 10, and the future does hold promise. The problem though is the age-old chicken and egg scenario; gamers want to see a title that does things they can't possibly get in XP, but before coders start developing purely for DX10, using it to its fullest, they want to see the user base increase.

The most recent survey of Half-Life developer Valve's Steam distribution system makes unpleasant reading for Microsoft, with under 16% of users sporting DX10-capable cards and only 4% with decent DX10 cards taking advantage of them under Vista. In short, someone's going to have to make that first move.

Google phone finally unveiled

But it's not in the form many people were hoping for.

The latest buzzword is 'Android' — a mobile phone OS developer that Google bought in July last year, and the name heading up its long-discussed Gphone plans. Instead of getting into the hardware business directly, Google's idea is to create an open-source platform that any hardware developer can implement.

It's a typically Google move: out of nowhere, an attempt to profit from a hundred different sources rather than selling one device or chasing one kind of customer. By default, the final phones will undoubtedly connect to every Google service, from Gmail to Google Docs, helping to push the brand and gather information, all the better to advertise and build consumer loyalty. For phone-makers, the obvious benefit is that they can customise everything about the experience, from features to additional content deals, without paying a fortune in licensing costs. Importantly, everything from the home screen to the applications provided can be changed or built upon individually — and just because Android is open under the GPL doesn't mean everything built for it has to be.

As for what Android actually does, that's up in the air. The SDK is publicly available, with the lead coming from the newly formed Open Handset Alliance, a consortium of over 30 members, including LG, T-Mobile, eBay, Nvidia and definitely not Microsoft. The first phones using Android are due to hit in the second half of this year.

The focus now is on getting the software ready, and getting the wider development community involved. A $10m challenge is the next step in getting proper software support behind the system. Demos are available from **http://code.google.com/android/samples**, including a Lunar Lander game, a database-enabled notepad and a number of one-shot API demos.

Will Google take over the mobile as well? We should know in about six months' time.

THE (A)PC REVOLUTION

February 1987

TOSHIBA T1100 PLUS

Our portable PC is not only smaller than IBM, it's lighter. And more powerful. Our 80C86 microprocessor lets you zip through work at up to twice the speed. And our maximum memory capacity is 640KB of RAM. Theirs is only 512KB.

The T1100 PLUS has other things the IBM doesn't. Like serial, parallel and CRT ports that are built-in standards.

IN LIVING MEMORY

If machine "intelligence" seems rather far-fetched, how about computers with logic components composed of molecules rather than silicon?

Molecular electronics will allow complex logical devices like computers to be constructed using individual organic molecules to perform the logic functions. . . it is likely to become the natural successor to the silicon chip.

IBM PC/RT

The IBM PC/RT is a 32-bit RISC machine which is fast and responsive in single user mode. . . The 'RT' refers to 'RISC Technology', where RISC itself stands for Reduced Instruction Set Computers.

Put simply, the goal of RISC is faster data processing achieved by cutting down the number of instructions that need to be built into the basic set of the microprocessor. The advantages are smaller processor chips, since they need less on-chip storage for the instruction set.

Nehalem chips will be rolling out of Intel's super-advanced 45nm processor factories — like Arizona-based Fab 32 — around the end of this year.

Intel's next-gen Nehalem uncovered

Concrete details emerge on Intel's 2008 modular CPU.

Further details of Nehalem, Intel's impressive new modular CPU architecture for 2008, have emerged. The new architecture will deliver a major boost in memory bandwidth, a new socket and a blazing-fast interconnect.

Pencilled in for the latter end of 2008, Nehalem is the next major cadence point in Intel's so-called 'Tick Tock' strategy of rolling out a new CPU architecture and silicon process technology in successive years.

As Intel revealed at its IDF conference in September last year, Nehalem will debut several major new technologies. The big news items are the integrated memory controller, optional on-die graphics, the new high-speed QuickPath interconnect and configurations with up to eight execution cores.

Recently, further details have leaked which fill in several of the specification gaps. First up is a triple-channel memory controller with support for DDR3 memory at speeds up to 1,333MHz. With three channels compared with the typical dual-channel arrangement of current x86 architectures, it should deliver a colossal leap in bandwidth. This will appear particularly impressive when compared with Intel's existing CPUs, which suffer from relatively slow discreet memory controllers.

Next up are the first detailed specifications for QuickPath, Intel's HyperTransport-bashing interconnect. Put in simple terms, QuickPath will be used to shuffle data in and out of the CPU and peripheral motherboard components.

It's thought each QuickPath link will pack a peak bandwidth of 6.4GT/s, with each CPU sporting two links. Do the sums (that's 6.4 billion transfers per cycle with each cycle transferring 32-bits) and it seems each link will therefore deliver 51.2GB/s. That is a whole heap of bandwidth, comparing well with the aggregate rate of 41.6GB/s per link and up to three links per chip for the latest HyperTransport interconnect used by AMD.

Combined with the big boost in memory bandwidth, a picture of a CPU and platform that can shunt an awful lot of data around is emerging.

That's a very important feature for an architecture that is expected to scale to as many as eight extremely data-hungry execution cores.

It will also no doubt help the new dual-socket server and workstation platform being cooked up to support Nehalem. Codenamed Tylersberg, the new chipset is expected to sport no less than four full 16-lane PCI Express 2.0 slots connected over QuickPath links between a bridge chip and the CPU. Once again, the implication is of a platform with immense bandwidth.

Nehalem looks like a serious piece of kit, especially when you consider further officially confirmed features such as HyperThreading. With two threads per core, that means a CPU with 16 logical processors is heading to a PC near you, probably as soon as 2009.

'No Email Friday': we would rather face the onslaught than deal with 'Lots of email Monday'...

No email on Fridays

Because a wasted day of lost productivity is better than... no, wait, why are we doing this again?

Fans of those cubicle culture cartoons featuring Dilbert will be pleased to learn that his spirit lives on in companies up and down the United States. There is no greater an example of how to totally miss the point when it comes to IT management than the 'No Email Friday' concept.

Companies which really should know better, such as Intel, Deloitte & Touche and US Cellular, have all started to ban the use of email on a Friday in an apparent attempt to reduce the amount of non-essential and personal messaging that goes on, while at the same time boosting worker productivity. Like all such hair-brained schemes it sounds perfectly plausible at first. After all, we all know how much time can be wasted by sending a few emails to your family, replying to messages and reading your spam. It sure beats working.

We understand that some companies are so concerned about the productivity impact that they are even going as far as to name and shame staff who flout the Friday ban — and fine persistent offenders. The trouble is, this is a totally flawed concept which might make good sense to the management types with nothing better to do than dream up such schemes, but is sheer madness to those workers actually having to suffer it. This is not, after all, a dress-down Friday thing where the only impact upon the workforce is a mild feeling of inadequacy, like the geeky kid in the school playground wearing the 'wrong' trainers. Instead it breaks down to suggesting that workers can get more done by doing less, and that is just plain daft.

Email is not a resource-draining monster that has to be slain on a Friday in order for the next week to progress smoothly. By ignoring email on a Friday, there is a huge backlog to catch up with on the Monday. It ignores the realities of modern business practice and is simply counter-productive.

"Instead of bringing email to a grinding halt at the end of the week," Alan Elliot, senior director of business development at email specialists Mirapoint says, "companies need to educate their staff on the appropriate use and management of email. Yes, email can induce stress if recipients are cc'ed on chains of unnecessary messages or if it's used as a substitute for instant messaging. But if effective usage policies are in place, rather than being a threat to productivity, email is one of the great business innovations of the online age. Why would any sensible company even consider restricting its use in this way?"

Elliot makes a lot of sense: the key to inappropriate email usage is effective management, not an inappropriate email ban. Acceptable Use Policies were invented to cover just this kind of thing, so why not update them and make sure that staff realise that sending cc's of stupid jokes around the office and beyond, entering into lengthy personal correspondence and the like is a no-no? Far better than cutting off your nose to spite your face.

Bill Gates' fashion sense gives a good indication as to the motives of his dress-down culture.

THE BUSINESS OF STUPID IT MANAGEMENT

FROM GLUED UP USBS TO DRESS-DOWN CULTURES

As far as stupid business ideas that illustrate how far removed from the realities of technology some people are, No Email Friday is right up there with using Superglue to permanently block USB ports so as to prevent unauthorised device access to network data (and prevent those computers from working with any authorised device in the future, of course). That and the dress-down culture at Microsoft's Redmond Campus, where suits and ties were not required. The workforce were told they did not have to wear a corporate uniform — so they all started wearing the same beige Chino trousers and white short sleeved shirts instead...

GET OUT OF MY FACE[BOOK]

If there's one thing social networking can be blamed for, it's substituting online 'friends' for real friends. You know, the ones you see in real life. Also, it's blurting your personal stuff for the world to see.

Facebook made its first major PR blunder recently with the news that some users were not happy about the way Facebook was publicising their online purchases. Called "Beacon", the advertising system reportedly tracked some online purchases of Facebook users, and shared that info — however embarrassing — with their Facebook friends. The problem? As Computerworld reported, the system was opt-out.

News that Facebook would let users turn off Beacon came with the apology from Facebook's youthful guru, Mark Zuckerberg, who is usually on the receiving of gushing praise by the IT media. "I'm not proud of how we handled the situation," he was reported as saying by Computerworld.

Now about that advertising...

Want to nominate a dumbest moment in tech? Send an email with the subject line "Dumbest Moments"to ***apcmagazinefeedback@acpmagazines.com.au.*** All correspondence becomes the property of *APC*.

Windows 7 takes shape

Will the next version of Windows be Microsoft's lucky number? *David Flynn* joins the dots on what we know to date about the successor to Vista.

With Windows Vista having already hit its first anniversary, the countdown clock is ticking on Microsoft's follow-up. We're still in the long dark before the dawn of the next-gen Windows OS, but the earliest signs are encouraging: a new streamlined kernel, an inbuilt VM for running old software, and a revised/simplified UI. There's every chance that Microsoft intends to see Windows not only rise from the ashes of Vista, but break with the past and do for the decades-old platform what Mac OS X did for Apple.

WHAT'S IN A NAME?

You can forget about the earlier codename of Vienna. Newly-minted Windows VP Steven Sinofsky has nixed fancy cyphers and gone back to version numbers, so right now it's simply 'Windows 7.0' (based on iterations of the NT-based kernel, with Vista being Windows 6.0). The final name that appears on the box will be anyone's guess, especially after such unexpected flights of fancy as Me, XP and Vista.

But we've got a hunch that Sinofsky might return to the simple year-based branding which Microsoft introduced with Windows 95 and has since applied to much of its OS and client software.

If that's the case, Windows 7 might end up as Windows 2010, based on a Microsoft spokesman's comments during a US sales conference in July 2007 that "Microsoft is scoping Windows '7' development to a three-year timeframe, and then the specific release date will ultimately be determined by meeting the quality bar." This means at least three years from Vista's arrival, setting late 2009 to early 2010 as the initial timeframe but marching onwards through 2010 if need be. OK, so maybe it'll be Windows 2011...

KERNEL KNOWLEDGE

We already know that the entire next generation of the Windows family will be built around a stripped-back 'microkernel' codenamed MinWin.

An internal project to strip back the NT kernel to the barest of bare metal, MinWin is "the Windows 7 source-code base" and will be used "to build all the products based on Windows" according to Microsoft engineer Eric Traut, who presented a sneak peak of MinWin in October 2007. That 'proof of concept' iteration consisted of just 100 system files, which occupied 25MB of hard disk space and ran in 40MB of RAM.

"It's not just the OS that's running on many laptops in this room," said Traut. "It's also the OS used for media centres, for servers, for small embedded devices."

INTERFACE-LIFT

There's no doubt that Windows 7 will sport a revised interface. It was Sinofky's winning gamble to give Office 2007 an all-new UI which swapped the decades-old clutter of menus, toolbars, task panes and what-not for a single task-aware 'ribbon'. That UI overhaul was led by Julie Larson-Green, who Sikofsky has since tipped to head the "User Experience" program for Windows 7.

> MICROSOFT INTENDS TO SEE WINDOWS NOT ONLY RISE FROM THE ASHES OF VISTA – BUT BREAK WITH THE PAST

Will the Windows 7 facelift be as revolutionary as that of Office 2007? That's harder to tell, because the change in Office 2007 wasn't made for change's sake: Larsen-Green went back to first principles for the suite, and she's likely to do exactly the same for Windows.

Starting with a clean slate, she'll be asking what people expect their computer to do, and then how an OS should fit in with that. But it's safe to say that feral UI elements such as Vista's 'icon overload' Control Panel are not long for this world.

THE RETURN OF WINFS?

More speculative is the question of WinFS, which sits atop the NTFS file system to allow data to be stored, accessed and managed based on relationships with other data. WinFS was originally to use the Yukon database engine of SQL Server 2005, which included native support for XML, but became the first of Vista's many 'foundation pillars' to topple.

Despite initial promises that it would be released in the year following the launch of Vista, the last news on WinFS was that some of its technologies have been rolled into the Katmai engine of SQL Server 2008.

Microsoft may well forge ahead with a relationship-savvy file system in Windows 7, built around the Katmai engine, but the 'WinFS' label could remain buried.

VIRTUAL MACHINES FOR 'LEGACY' SOFTWARE

According to a thread (since removed) on Microsoft's 'Channel 9' community forum site in July 2007, Windows 7 will use virtualisation to run any software that hasn't been specifically written for Windows 7 or using Microsoft's .NET language.

OS-based virtualisation makes sense for plenty of reasons. Microsoft already has the technology in Hyper-V, the

Rolling hills XP and Aero 3D Vista — what will the next Windows look like?

hypervisor-based virtualisation system designed for Windows Server 2008.

And hardware won't be an issue: by the time Windows 7 arrives circa 2010, quad-core will have replaced dual-core as the mainstream, with substantially larger cache including superslabs of Level 3 cache.

L3 already exists in AMD's 'Barcelona' architecture and has been hinted for Intel's 'Nehalem', which will succeed the current Core micro-architecture in the second half of 2008. (In fact, if Windows 7 breaks cover towards the end of 2010, it'll be accompanied by Intel's post-Nehalem Core microarchitecture revision, codenamed Gesher.)

Also, considering that Nehalem will debut with eight cores in a single die, there's no reason we couldn't see a string of single cores each being set aside for running a VM, with a flash drive used to hold and launch the virtual machine software in order to dramatically boost session speed, especially during the 'transition states' of startup and shutdown which represent so much of the VM overhead.

PCs will also sport obscene amounts of memory: 4GB will likely be equivalent to today's 'entry level' of 1GB, with flash drives used in concert with hard drives to actively store files rather than just be a shot-term cache.

A LINE IN THE SAND..?

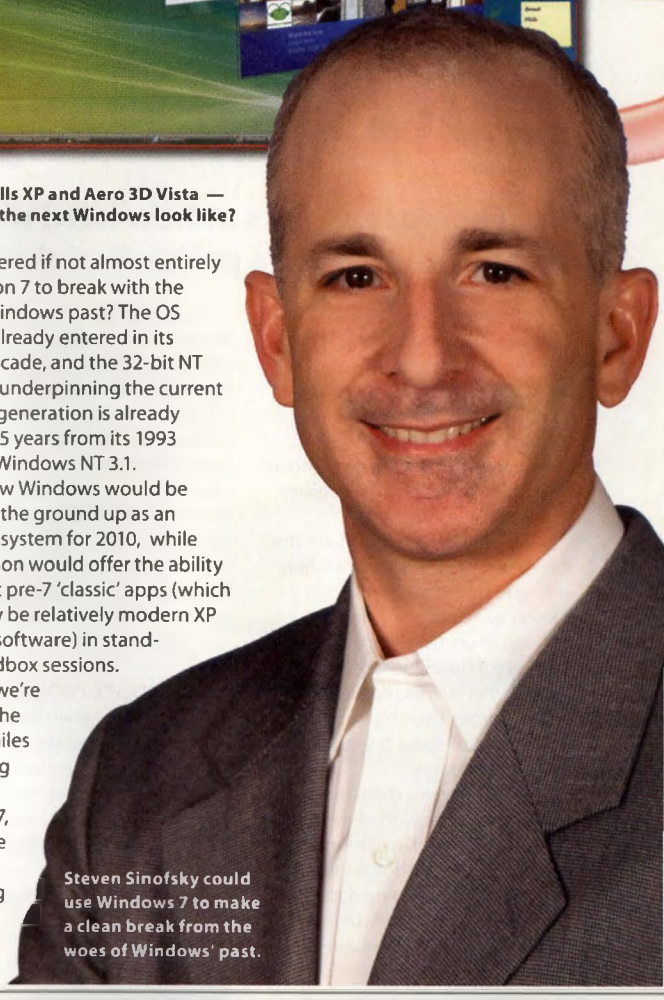
It's worth noting that virtualisation is comparable to how Mac OS X handles Mac OS 9 software: a 'classic environment' is launched, creating a single self-contained instance of OS 9. Apple used this approach to provide backwards compatibility for old software when customers made the leap from OS 9 to OS X.

And it should be remembered that OS X was in fact an all-new operating system, which cleverly sported a UI that mimicked (yet incrementally improved upon) the more familiar elements of OS 9.

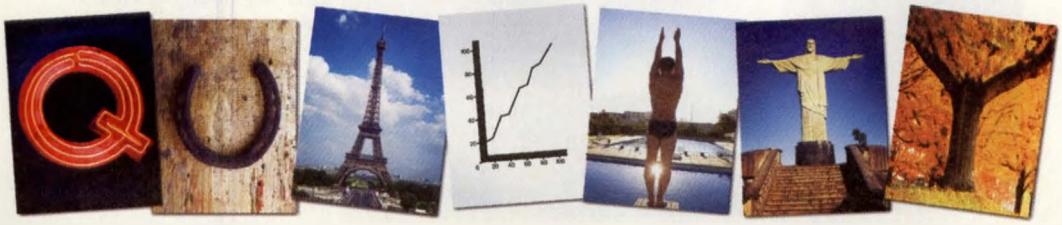
Might Microsoft be planning a similar seismic shift, using a radically re-engineered if not almost entirely new version 7 to break with the woes of Windows past? The OS itself has already entered in its second decade, and the 32-bit NT codebase underpinning the current Windows generation is already nudging 15 years from its 1993 launch in Windows NT 3.1.

The new Windows would be built from the ground up as an operating system for 2010, while virtualisation would offer the ability to support pre-7 'classic' apps (which will mainly be relatively modern XP and Vista software) in stand-alone sandbox sessions.

While we're trudging the first few miles on the long road to Windows 7, it looks like being a fascinating journey!



Steven Sinofsky could use Windows 7 to make a clean break from the woes of Windows' past.



EPSON
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GENUINE EPSON INKS AND PAPER

How the police find what's on your computer

***Jon Thompson* looks at how hard disk data-recovery techniques help the police find data deleted or hidden by criminals.**

The technology that's helping computer forensics is advancing so quickly that eventually, if you commit a serious crime, your only hope of any technology you used not incriminating you will be to destroy it completely and scatter its ashes into a river.

While file deletion tools are fine for removing personal data when selling or giving away your old computer, science will stop at nothing to uncover electronic evidence if the crime is serious enough. Recovering data almost atom by atom, investigators can get amazing results and eventually catch the criminal.

From its earliest days, the rise of computers in the workplace has also seen the birth and evolution of a vital, multi-million-dollar industry dedicated to recovering data that can be lost all too easily. In the intervening years, techniques pioneered in recovery labs have pushed back the boundaries of what's possible to almost science-fiction levels.

Take the work of UK-based Vogon International (**www.vogon.co.uk**). Founded in 1985, the company confidently claims that data is rarely ever lost completely: it's just been rendered unreadable by whatever disaster has befallen it. The causes of lost data can be as diverse as the resurrection techniques used.

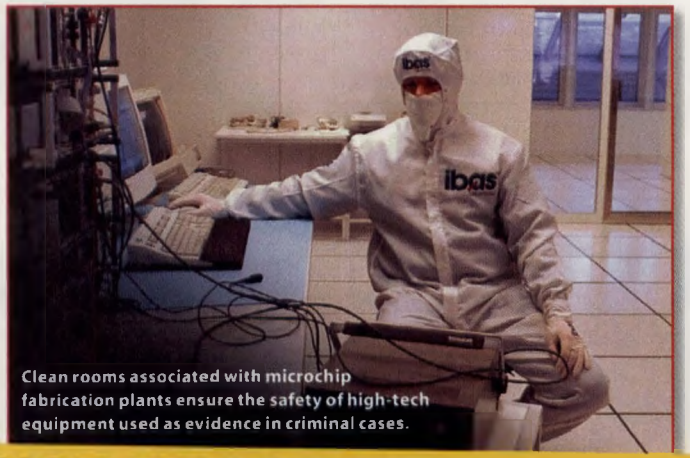
Increasingly, the police and security agencies are also calling on these techniques in the fight against organised crime and terrorism. The range of devices and techniques that data-recovery labs now use regularly to revive electronic information grows as new forms of communication appear. Mobile phones, PDAs, cameras and memory sticks will all reveal their secrets. You just have to know where to look and how to interpret what you find.

USUAL POLICE PROCEDURE

What happens when the police seize a computer suspected of carrying evidence of serious crime? The initial challenge is to make sure that the machine is kept exactly as it's found. In the UK the Association of Chief Police Officers (ACPO) has published a set of guidelines for scene-of-crime officers to do just that.

The first golden rule is to record everything exactly as it's found, including which cables are connected to which sockets. The next rule is not to switch the computer on. In the case of a laptop, this includes not opening the lid in case it inadvertently wakes the system.

In a situation where computers are found running, the ACPO guidelines say to pull the plug from the computer, not from the wall. This ensures that a battery-backed power supply can't warn the computer that something is wrong. If there's a printout in progress, the advice is to let it finish before cutting the juice. Perhaps most importantly, the guidelines recommend that officers should never act on the advice of the computer's owner. Everything is then put into evidence bags, catalogued and carefully taken away for investigation.



Clean rooms associated with microchip fabrication plants ensure the safety of high-tech equipment used as evidence in criminal cases.

Once in the lab, the first thing to do is to take the computer to the clean room, remove the hard drive and make a bit-by-bit copy. This ensures that the original is always kept in exactly the same state as when it was seized, in case the defence needs a copy for its own tests. Investigators can then boot up a second computer using the copy and see if any sneaky software in the boot chain realises it's in a different computer, and tries to wipe the disk — a strong indicator in itself that the computer's been used for suspicious activity.

The next step is to assess what's on the drive. Labs use sophisticated, bespoke software to audit the drive for files, both those that are in use and those that have been deleted. This produces a searchable index of known files and their content. As Vogon points out in a web site overview of its techniques: "Looking for one or two words or an account number across gigabytes of data is a bit like looking for a needle in a haystack." To overcome this challenge, text-recognition algorithms are put to work.

A mere password is no match for this discovery process. BIOS passwords may be reset in hardware, for instance, and powerful

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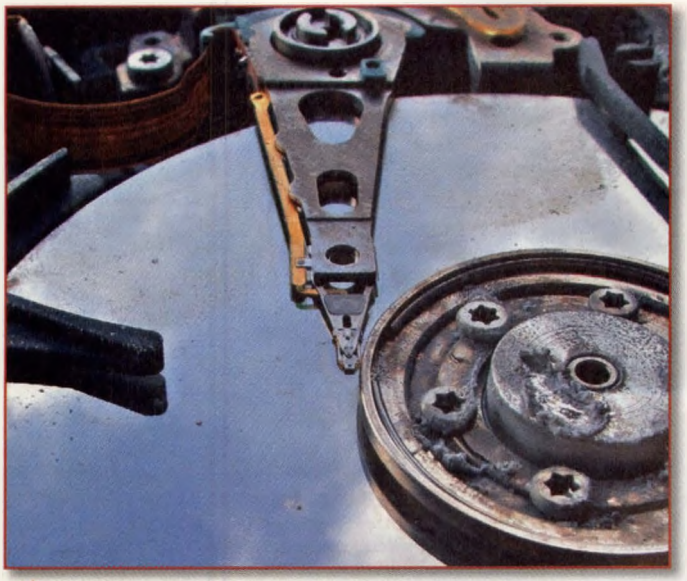


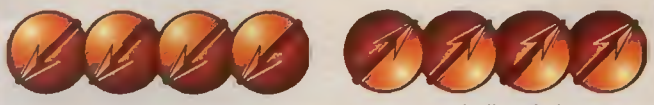
After a natural disaster, clients call upon data-recovery companies. This drive was thought lost during Hurricane Katrina, but Disklabs managed to recover the data. Photo credit: Dan Armishaw

GHOSTLY TRACES

HOW DATA IS RETRIEVED FROM A HARD DISK DRIVE

On the surface of a hard disk drive, groups of iron atoms are polarised magnetically to represent either binary '1's or '0's. After overwriting with a second pair of '1's, the group of atoms on the right that previously represented a '1' is more polarised than the group on the left, which previously represented a zero. A magnetic force microscope can see this very slight difference in the strengths of the polarisation and can help determine the patterns of data that were there before the second write. The hope is that this technique can accordingly recover data from deliberately reformatted drives.

INITIAL STATE



Atoms magnetically polarised to represent a '0'.

Atoms magnetically polarised to represent a '1'.

AFTER BEING OVERWRITTEN WITH BINARY '1'S:

password-cracking programs are brought to bear on the rest. But what if the investigators fail to crack the protection, and the accused party refuses to provide the relevant codes? It may seem like a reasonable refusal at the time, but, before a jury in court, such silence may easily be taken as an admission of guilt.

Analysing files and their content isn't the end of the computer forensics story by any means. In fact, it's just the beginning. Data forensics labs can delve much deeper — and sometimes, they get vital help from the hardware itself.

READING CORRUPT SECTORS

During normal use, wear and tear to a hard drive such as the odd knock or bump, or deliberately moving a running computer, regularly causes a small percentage of disk sectors to become corrupt. As a safety measure, modern disk controllers automatically take this gradual degradation into account and work around it to maintain the drive's reliability. To do this, the onboard firmware maintains two lists of sectors: the primary list and the grown defect list.

Often referred to as the plist, the primary list stores sectors that are known to be bad. The manufacturer's testing procedures generate and store this list before shipping the drive. The drive controller will never attempt to use any of these sectors.

By contrast, the grown defect list or glist stores the growing line-up of sectors that the drive controller itself marks as being suspect during the drive's lifetime. It may be that the controller has to make several attempts at reading data back correctly from a particular sector, or it may be that the sector simply won't take data in the first place.

Whatever the reason, when the controller encounters a dodgy sector, it immediately copies the data it contains to a good, empty sector somewhere else on the disk before it's lost for good. It then adds the bad sector to the glist.

Crucially, the disk controller never again overwrites sectors contained within the glist, even when reformatting the disk. After all, why reformat sectors you'll never use again? When instructed to do so by specially crafted, low-level software, however, the drive controller will happily read the sectors in the glist, yielding their original content.

Estimates vary, but some sources put the number of sectors contained in the average glist at up to 0.5% of a laptop disk drive's capacity. This sounds insignificant until you realise that it represents around 50MB for every 10GB of disk space, or around 600MB on a 120GB drive.

> MOBILE PHONES, PDAS, CAMERAS AND MEMORY STICKS WILL ALL REVEAL THEIR SECRETS. YOU JUST HAVE TO KNOW WHERE TO LOOK.

USING MISREGISTRATION

But surely, if you take care to erase the data left in deleted files using a file-destruction program, it will overwrite the data so much that no one will ever be able to retrieve it? This is certainly the case for commercial, off-the-shelf file-recovery utilities — but give the drive to a forensics lab, and miraculous things begin to happen.

Data-recovery technicians have discovered that they can exploit a quirk of how disk drives work to recover data that's been overwritten, even when it's happened dozens of times. The technique they use is gaining in importance and is fast becoming easier to carry out.

Here's how it works. The concentric tracks containing the sectors on which data is stored in a modern, high-capacity hard drive are around one tenth of the width of a human hair. Whenever the drive's control motor moves the read/write heads across the surface of the disk to locate a particular track and sector, there's always a microscopic inaccuracy in the positioning. Disk manufacturers and forensics technicians refer to these inaccuracies as 'misregistrations'.

In normal use, the disk inaccuracies are so small that they are harmless to data storage and recall. Because of these tiny misregistrations, however, when you overwrite a file, the new pattern of magnetism doesn't always completely cover exactly the same

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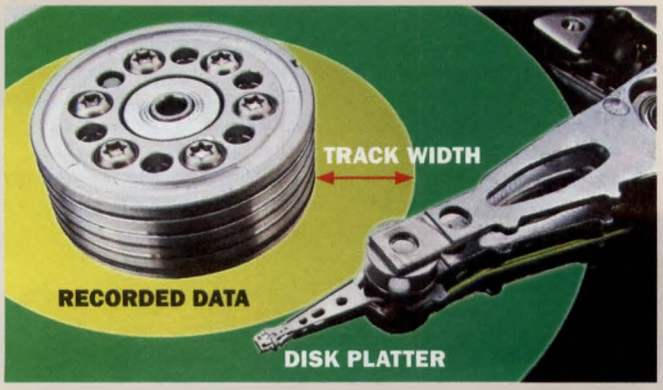
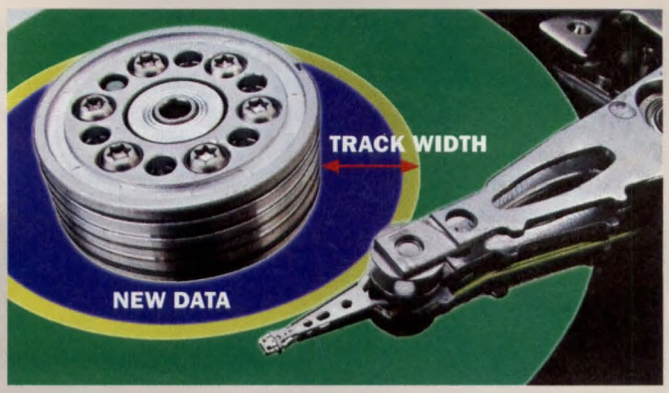
MISREGISTRATION EXPLAINED

HOW DATA ISN'T COMPLETELY REMOVED, EVEN IF IT'S REWRITTEN



When writing data, the read/write head of a hard disk drive writes the binary information to one of the many very thin concentric tracks on the hard disk platter. However, because of inaccuracies in positioning the read/write head, it might not use all the space available for the track.



Because of these tiny inaccuracies, called misregistrations, some of the old data remains after being overwritten. This tiny sliver is readable by a very accurate and sensitive device called a spinstand tester, thereby making previously stored data available.

area of disk as the one it's overwriting, leading to very thin slivers of data from previous writes being recoverable from the edges of the tracks. But the read heads themselves are not sensitive enough to pick up the now much weaker signal from the old data.

The job of recovering the information falls to a very sensitive machine called a spinstand tester, which is normally used to test hard drives. The heads fitted to these amazingly accurate machines are sensitive enough to differentiate between the slivers of old data and the newly laid-down pattern of magnetism. This is because, while the tracks are around 400nm wide, the piezoelectric motors in a spinstand tester have an accuracy of just 0.3nm — far more accurate than those found in domestic hard disks. By dismantling a drive and mounting a platter in a spinstand tester, it's possible to read those slivers of data.

This is a painstaking technique, made necessary by the severity of the crimes to which it's applied. "We have recovered names, telephone numbers and credit card details from a machine belonging to a suspected Irish terrorist by using this technique," says a Vogon spokesperson. But if the use of spinstand testers seems incredible, what comes next will seem positively sci-fi.

Spinstand testers like this one are so accurate, they can read back data thought destroyed by destruction programs.

THE MAGNETIC RECORD

Associate Professor Romel Gomez, of the Department of Electrical and Computer Engineering at the University of Maryland, says that he can read the original content of a disk or magnetic tape that has been completely overwritten by new content, even when misregistration does not occur.

He does this using an incredibly sensitive device called a magnetic force microscope. This measures the magnetic polarity of the individual groups of iron atoms on the disk used to store each bit of information. The more highly polarised these groups of atoms are, the stronger the magnetising field must have been. What Gomez realised, however, is that the strength of polarity could be due to successive magnetisations.

It works exactly like this: imagine two bits on a disk, the atoms of one polarised to represent a binary one, the others polarised the other way to represent a zero. If these two bits are now both overwritten with the polarity representing a binary one, the bit that was previously polarised to represent zero will now be less polarised when representing a one than the bit originally set to one. It's the job of a magnetic force microscope to pick up these tiny fluctuations in polarity strength.

Gomez claims to have read back the original data from a disk he had deliberately overwritten first. "This means that it's not completely safe to reformat your hard disk," he warns. The process is, at present, a very slow one, however. "Extracting one kilobyte of data per hour is optimistic," he admits. It's still early days, however, and Gomez acknowledges that his disk-reading technique is still at an experimental stage at the moment, but with spinstand testers already being used in data forensics labs, it might only be a matter of time before this technique also becomes widely used.

> IT'S BAD NEWS FOR CRIMINALS, AS SOON, IT SEEMS, THERE'LL BE NOWHERE FOR DATA TO HIDE

It's bad news for criminals, as soon, it seems, there'll be nowhere for data to hide, and no way to delete it for good other than grinding it to dust and scattering it to the four winds so that it physically cannot be found. apc

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When I'm 64

Will Vista drive 64-bit desktop computing in 2008?

With support now common, and its RAM modules dropping in price, there's no reason not to use 64-bit versions of Vista.

Until Vista came along, I had never run a 64-bit desktop operating system and hadn't even installed one (apart from server OSs of course). Why not? Well, it was just never really necessary. Driver support for 64-bit Windows XP platforms has always been rather flaky, and without an overwhelming reason to do otherwise, most users would always go for 32-bit, leaving 64-bit firmly in the server room.

However, since the release of Windows Vista, approximately half of the machines I've installed it on are running the 64-bit version. This is due to a couple of reasons.

Firstly, you have to move to 64-bit to overcome the 4GB RAM limitation of 32-bit platforms. Note that this isn't restricted to Windows — all 32-bit operating systems cannot reference physical RAM above 4GB. Some OSs are better at it than others — Novell Netware can reference the full 4GB, while Windows never really gets beyond 3GB (and even that's with a lot of tweaking).

Secondly, so many CPUs on the market are 64-bit. Even if the system doesn't have 4GB of physical RAM installed, there's still a drive towards 64-bit if only to get the full benefit of the CPU's capabilities. This is especially the case if you're planning to run any virtualisation software like Virtual PC or VMWare Workstation.

64-bit CPUs and RAM modules are so cheap now — you can easily buy 4GB RAM for less than $200 — so why wouldn't you lash out? Traditionally, the reason not to has been the dependence on 64-bit computing to get the benefit, but with Vista the pain of 64-bit seems greatly reduced.

This is assisted to a very great extent by the massive support offered by hardware vendors, especially motherboard and integrated peripheral manufacturers. These days, any decent vendor offers full 64-bit support without any caveats — there's no warning that, by choosing 64-bit, you're in some way missing out on features enjoyed on 32-bit platforms.

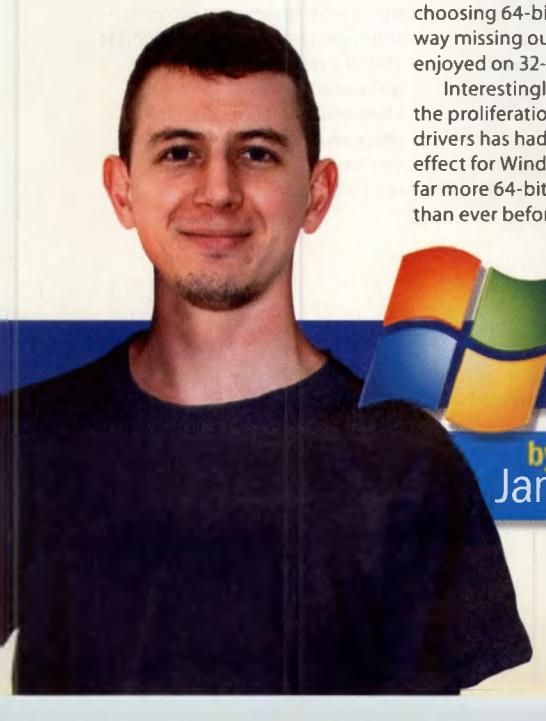
Interestingly, it seems that the proliferation of 64-bit Vista drivers has had a welcome flow-on effect for Windows XP users, with far more 64-bit XP drivers available than ever before, breathing a new lease of life into the older operating system and ensuring that it's not going to get totally left behind in a new 64-bit world.

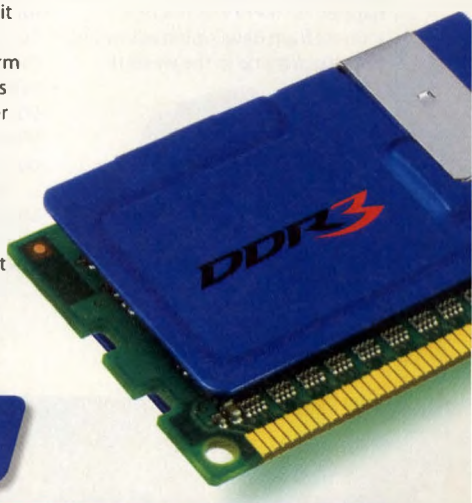
This enhanced driver support is critically important because there's certainly one very important aspect of 64-bit computing which hasn't changed — you must install signed, supported drivers. Any 64-bit version of Windows Vista will flatly refuse to install an unsigned driver, as the chance of dodgy driver software causing stability problems is far greater.

Having said that, I've found that there is some room to manoeuvre. As long as a driver is signed, 64-bit Vista may be able to use it, regardless of what type of platform it was written for. I discovered this recently when a 32-bit Vista driver allowed me to install an older Epson scanner, even though it explicitly had no 64-bit XP/Vista support. Of course, you wouldn't want to try it with something important like chipset drivers, but in some cases it's worth the risk.

And what about application support? So far I've found that 64-bit Vista will run just about anything in either native 64- or emulated 32-bit mode. Whether or not an application states that it supports a 64-bit platform, I've found that it's far more likely to run than not.

It seems that Microsoft has made such strides in 64-bit computing with Windows Vista that the user experience is almost exactly on a par with the 32-bit iteration, and this is going to result in a much wider adoption of 64-bit home user platforms in 2008.





HastalaVista

by James Bannan

James Bannan is a systems manager at St Leonard's College (Vic) and APC's resident Windows expert. He'll be checking out Vista for you every month.

Eeexcellent

The OLPC project and the Eee PC may just highlight the future of portable computing.

Small and cheeep: the advent of the ubiquitous laptop.

It may seem like an incredibly obvious product to produce, but the ubiquitous laptop still hasn't made a debut yet — although it's getting there.

For ubiquity you need affordability. Light, easy-to-carry laptops are nothing new. We have the ultra-portables and the sub-notes; we even have Tablet PCs. But they all charge a premium for size, and so are far from affordable.

Do we really need all the bells and whistles? No. Is it really that hard to make a cheap — almost *disposable* — take-it-anywhere laptop?

Ironically, and ostensibly, the OLPC project (**laptop.org**) started with the goal to produce very cheap, just-adequate-to-the-task laptops for the developing world with the philosophy that arming children with computers is arming them with education for life. It's an excellent goal, and after years of development — including researching and producing new technologies (such as the LCD screen that's easy to see in daylight, and the impressive mesh networking) — a funny thing happened: there was not only interest from developing countries, but also *demand* in the western world. Average people, in affluent societies, wanted one.

The OLPC, as you may know, uses AMD CPUs and Linux as an operating system. Both of these choices provided for savings in production costs. This eventually earned the ire of competitors Intel and, to a lesser degree, Microsoft, and so Intel developed its own 'Classmate' PC that, by default, runs Windows. Intel chips in such machines is just as good a solution as AMD processors, as both companies have a range of CPUs for low-power, low-end systems. But it's more than amusing that the first casualty if you're going to build a cheap computer is the OS — why pay a premium for Windows, especially when you don't even need it?

But even Intel's machine is targeted to the same (gigantic) market as the OLPC — the developing world (and the potential for millions of sales). Which still leaves the population of first-world countries asking where their cheap laptops are.

And ASUS, it would seem, is willing to deliver. Although again its new Eee PC is supposed to be targeted at children, it's adults that have caused the machine to sell out in its first month. It seems bizarre that the movers and shakers of the IT industry haven't cottoned on that your average Joe can appreciate — nay, demand — a simple, small, light, effective and dirt-cheap portable computer. Yes, Sony, your latest ultra-portable is a beauty, but I don't want to spend three grand on a laptop. Yes, Dell, your new XPZMEGA laptop can rival a Cray, but I don't need all that power for a portable machine. Where is the simple, cheap laptop? You know, the one you can take on a bus, to the beach, to the toilet, to the bedroom, and just do tasks like browsing, emailing and listening to music? And if you break it, lose it, or otherwise malign it, then it doesn't matter — it was cheap as chips.

It's about time we got a machine like the Eee PC, and it's just the start. The sub-$500 laptop is very capable for its modest hardware, not the least because it runs Linux and open source applications and so has the benefit of not passing on the cost of an operating system to the consumer. In this market of cheap computing, Microsoft simply can't compete with free. As these machines continue to develop we'll see more power for even less money, and the age of ubiquitous laptops will finally come to pass — although, let's be clear, even this is a bit of a misnomer. What we're really waiting for is the age of *ubiquitous computing* for which Linux and dirt-cheap, portable machines of all types are the key components. APC

LinuxWindow

by Ashton Mills

Editor of the **Linux Pocketbooks** *series, and now with CHOICE magazine, Ashton has been a tech journo for over 12 years, including five years with* **APC**.

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Better to be a **Dumb CIO**

There's a good reason why CIOs should not show any technical ability, argues a CIO.

David Williams, Chief Information Officer for a Newcastle, NSW, company, writes: "Bravo to *APC* for advocating CIOs to be required to demonstrate actual technical ability. But, sometimes showing how techie you are can backfire: being a tech-savvy CIO I get constantly bugged with the most inane crap.

"Never mind the fact I'm trying to plan how to integrate two multi-million dollar businesses and never mind that I've spent a lot of money hiring an excellent IT Manager and purchasing help-desk software. The CFO seems to think it's a better use of my time to help him right then and there swap a SIM card from one phone to another.

"In IT I think we spend a lot of time just doing other people's thinking for them. It blows me away how supposedly intelligent people lose all capability to think immediately when they hit a technical snag. Yet, wouldn't it seem ridiculous if I demanded the CFO's immediate attention every time I needed to add two numbers together?

"Today, one of the support requests is to help a guy who forgot how to undock his laptop so he's been taking his docking station home and back for three days.

"Back to the CFO, the villain of the piece, he asked me for instructions on how to use the fax. I thought he was kidding but he wasn't! So, I emailed some instructions like 'put document in face down, dial number, press send' and he actually printed them out and stuck them to the wall near the fax machine! Even then, the other day I saw our lawyer over near the fax machine saying 'Now, how do I use this?'!!!"

HOT MUMMA

Phil (Pippo) Zedda, who runs his own PC repair business, went to a customer's place because she could not manage to open Internet Explorer. "When I got to the house, a beautiful 40-to-45 year old woman opened the door. I thought, 'Great, my day starts well'." Even better, Zedda found there was no problem with her PC; she just didn't know how to use it because normally her children did it for her. So he showed her how to start IE and left without charging. He also left the hot blonde his business card, in case she needed help with any more problems.

"This was very bad mistake," Zedda concedes.

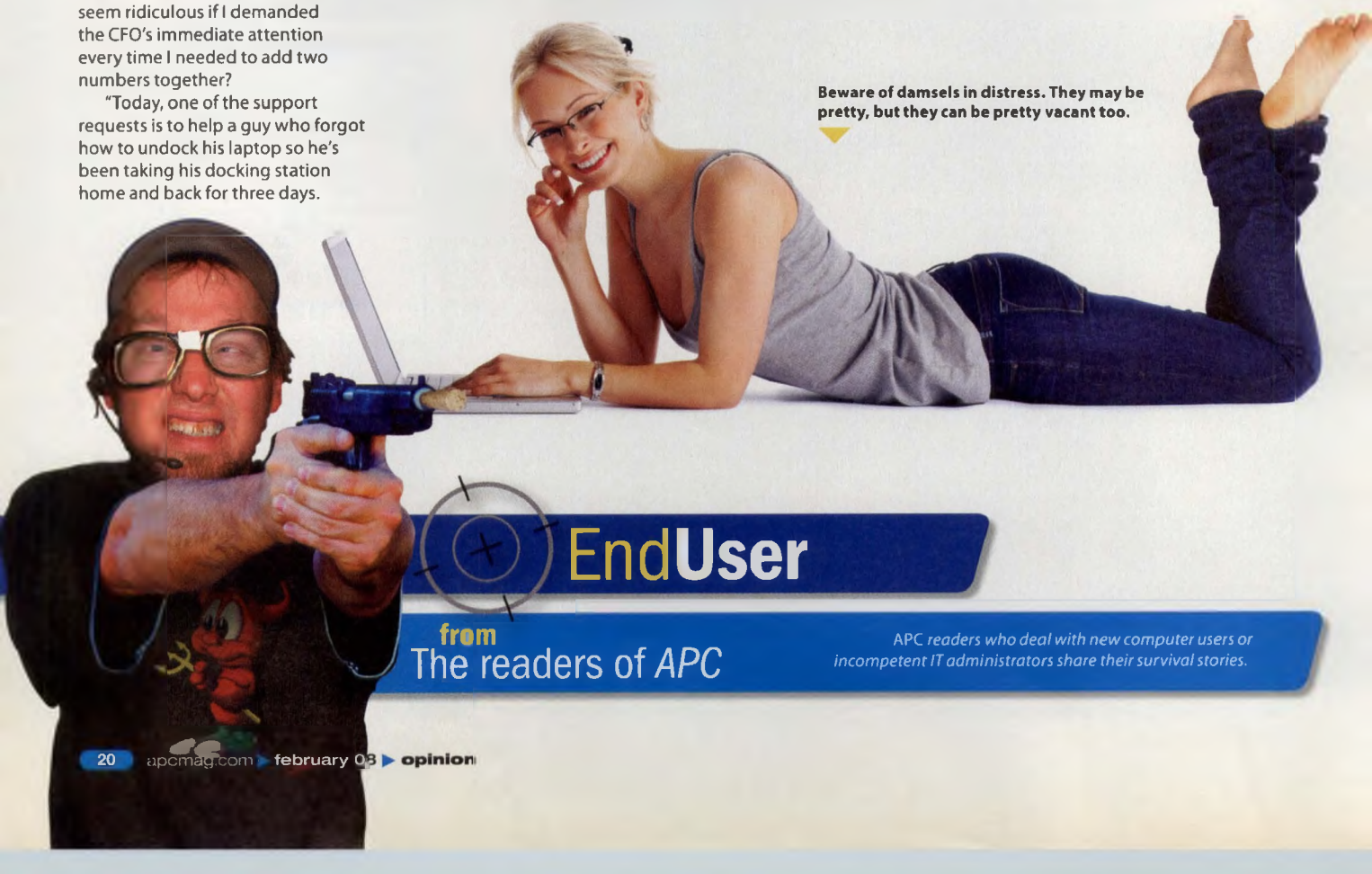
When he got home, he received more than 20 calls as the desperate housewife tried to use the PC. A few days later, as he was about to go to bed, she rang him on his mobile, complaining that IE had now completely disappeared. After investigating what buttons she'd pressed, he told her it hadn't disappeared — she'd just minimised it.

Zedda offers this story as a warning to any PC repairmen keen to 'help out' attractive ladies. "Beware!" he says.

NO MICROPHONE VOIP

Steven Boyle from Bray Park, Queensland, is the leader of an online gaming clan. "We play several games and, naturally, if you are serious about games you have a VoIP program going while you are playing the game, so you can communicate with the other players. This chap emailed me one day wanting to be able to talk to the other gamers, so I gave him the details of the program we were using, together with the IP address and a set of instructions on how to set up the program.

"I got on the game next day and who should be on, but our friend, who had his VoIP running. I start talking to him, but get no replies. He soon writes back in-game saying he can't hear me. So, through MSN Messenger, I patiently take him through every step of the setup again. I then ask him what sort of microphone he uses, as it may be broken and he replies 'Microphone, oh, I don't have one of those! Do I need one?' I told him if he didn't have one, I'd have more chance of talking to ET than to him."



Beware of damsels in distress. They may be pretty, but they can be pretty vacant too.

EndUser

from The readers of *APC*

APC readers who deal with new computer users or incompetent IT administrators share their survival stories.

"If only I could look at real estate online instead of driving around all weekend..."

A quarter-century of **stupid**

Nikola Gibson of Forest Lake, Queensland, has been in IT training and support for approximately 25 years. She's seen it all. We've collated several of her anecdotes.

CLOSE THE DOOR WHEN YOU LEAVE

"Back in the days of 5.25in floppy disks and levers to shut the disk drive door, I was giving help desk instructions over the telephone: 'Now, insert the disk (label facing upward) and shut the door,' I told one user. This was followed by silence, so I asked 'Have you done that?' I then heard footsteps walking across the room and a door shutting. 'OK, I've shut the door,' the user said. I could tell I was in for a loooonnng help desk call..."

MOUSE ON A LEASH

"Some years ago I was showing a class how to use a ball mouse (this generation hadn't grown up with computers, and mice weren't as advanced as they are today). Someone in the class was amazed to learn that when the mouse reached the end of the mouse mat, you could lift it and put it back down again in order to move the mouse pointer forward. They told me they had been holding a clipboard folder in front of their office desk and rolling the mouse from the desk onto the folder in order to continue moving the mouse pointer to the top of their computer screen."

HOLE IN THE HEAD

"I received a call from a user who said she couldn't get her computer to read the data on the 5in disk I had given her. She said the disk hadn't been exposed to sun or heat or magnets or anything — she had hole-punched it and put it in the 2-ring binder I had given her, together with the user documentation. Well, that would explain it!"

DISK UNDER-COVER

"I received a support call from a user who could not remove a 3.5in floppy disk from their computer. The caller told me she had gone to a lot of trouble to remove the disk from its cover and now couldn't get the disk out of the disk drive. After asking what she meant about removing the disk from its cover, she explained how difficult she had found it to cut the outer hard plastic cover so she could remove the diskette and insert it into her computer. I explained that the cover was never intended to be removed and that's why it would have been so difficult, and that she needed to bring in her computer so the techies could open it up and remove the loose disk."

OUTDOOR EXPRESS

"One user rang to say his mother was having a problem 'transferring something to somewhere using Outdoor Express'. That wasn't exactly helpful information. After some investigation, it turned out they wanted to stop certain emails from automatically going to the SPAM folder in *Outlook* Express."

IT (IDIOT TEACHER?)

"I know this is hard to believe, but a TAFE teacher (teaching Certificate IV in Information Technology) recently told the class '...and one day we'll probably be able to look up real estate on the internet, and be able to see what homes are for sale, and even see inside the home, all from the comfort of our home without having to drive around in the heat..."

The adult students all looked at each other trying to gauge whether the teacher was joking, given we can already do that. When we realised that the teacher was serious, one student puts up his hand and politely informed the teacher that this was already possible. Was this guy living under a rock?"

WINNERS!

This month's published End User writers win a Roxio Easy Media Creator 10, Roxio's Vista-ready flagship suite of digital media applications worth $159.95. Easy Media Creator enables you to quickly and easily produce impressive multi-media projects that combine photos, video and music. Creations can be shared and enjoyed on CD, DVD, the web or on popular portable players and mobile phones. Easy Media Creator 10 also includes Roxio MyMoments, which shows how other consumers are making the most of Roxio's rich applications.

SEND US YOUR CONTRIBUTION AND WIN A PRIZE!

Send in your tales of woe involving dumb end users or incompetent techies to ***apcenduser@acpmagazines.com.au*** and if we print it, you'll win a prize. You must supply contact details in order for us to verify your contribution.

The grey area

One reader's experience of Vista and CS3 not playing friendly highlights the amorphous nature of customer support for software issues. Watchdog investigates.

All care, no responsibility... I'm living proof that everything you have heard about Vista compatibility issues is true. Recently, I bought a powerful new rig. All the power statements were there... dual-core 3GHz processor, the latest-generation motherboard, 2GB RAM, a video card with grunt, 3 x 500GB HDD. It should all work sweet as a nut!

On goes Vista Ultimate. Check. On goes Office 2007. Check. On goes Adobe CS3 Design Premium. No check. I won't even begin to tell you about all the other stuff that simply won't install. A check of the forums reveals no clear solutions, so it's on to Adobe Support. After lots of calls to Adobe product support and scores of wasted hours trying fruitless solutions, I am told my problem is unique in the southern hemisphere — oh really? — but that I shouldn't worry as my issue is being escalated to senior tech support in the US — somebody will call within 7 days. After two weeks, nobody has called.

The point to this whole sorry affair is it graphically underlines how poorly we as consumers are treated when it comes to software. Brands such as Adobe point to product support as a strong point of their service. In reality it's a filter system hidden off-shore in the Philippines that separates the customers and Adobe from its accountability to deliver a product that does what it says it will.

My situation is classic — $400+ tied up in Vista, $3,000+ tied up in Adobe CS3, publicised assurances by Adobe that its product is Vista-compliant. In spite of this, nothing works and it doesn't look like it will any time soon. If I experience problems with a new car I can take it back to the dealer for satisfaction. The same rules apply for a plasma screen, mobile phone and just about any other product I buy. But not so with software. It's time we got a better deal, don't you think?

By the way, I finally managed to get CS3 fully operational. How? By reinstalling XP. Hardly a solution I think. The whole issue of accountability just became murkier.

Kevin Whiford
Prospect, SA

Watchdog referred Adobe to Kevin's complaint and asked them to account for his experience of their software and service. The company responded with the following:

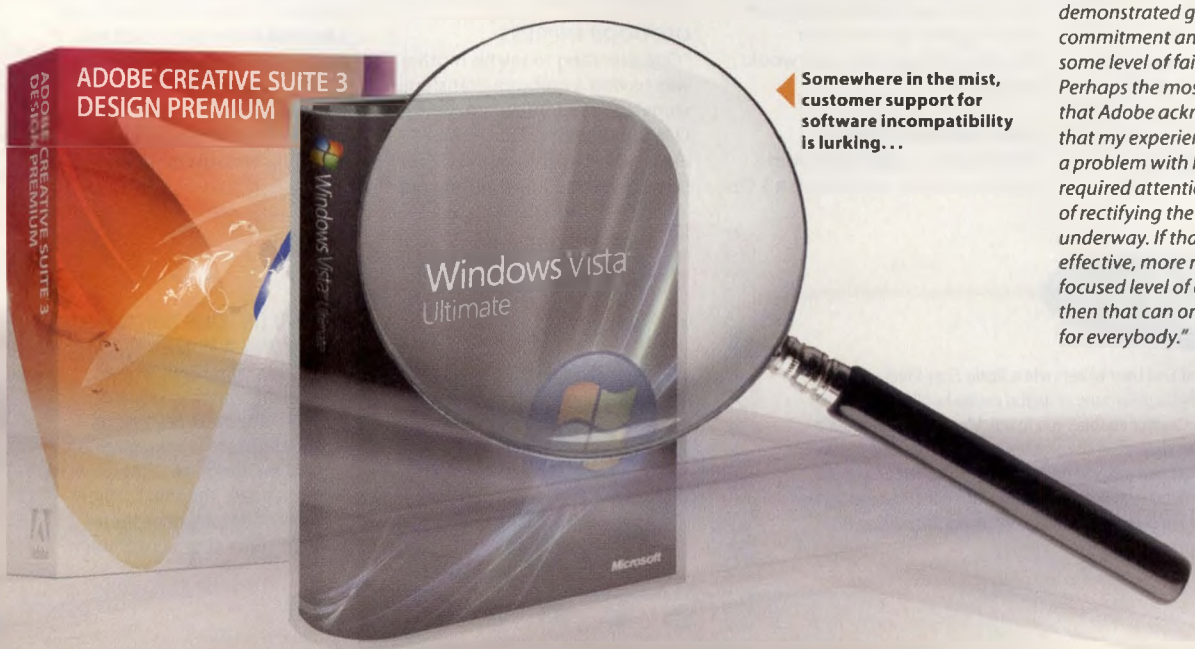
Dear Watchdog,

Adobe prides itself on listening to its customers and ensuring we provide great products and a high quality of service. Clearly in this instance we did not meet our usual high level of standards. We are reviewing our customer processes and have already taken steps to ensure this experience is not repeated. We have been in direct contact with Kevin and apologised for the delay and inconvenience he experienced.As always we appreciate feedback and welcome our customers to engage with us to ensure the overall Customer Experience is a positive one. Thanks for the right to reply.

Mark Cokes
Pacific Marketing Manager
Adobe

We contacted Kevin, who told us he had eventually managed to reinstate his Vista install and get the full CS3 suite working correctly via a combination of auto and manual update downloads as well as a de-install, re-install and auto repair of the last delinquent application in the suite — Acrobat Professional — but pointed out that this had taken him two months to achieve. During this period, Kevin ultimately received a very sympathetic and apologetic phone call from a "senior service executive", but Kevin remained unswayed in his criticism when he spoke to Watchdog: "Product support, in terms of the advertised phone support did absolutely nothing except complicate the process. Not one suggestion they offered worked, details of previous calls were either poorly recorded or not recorded at all, not one promise of follow-up support was met, not one promise of managerial follow-up was delivered on — each and every call ended with a vague promise of solutions that simply never eventuated...

"That was of course, until APC took an interest in things. In the final analysis I guess I am now pretty happy. Both Vista and the Adobe Suite are working quite harmoniously. That it took such a convoluted journey is as disappointing as it is bewildering. In many regards I was pleased that Adobe had bitten the bullet and called me — such action demonstrated genuine service commitment and helped restore some level of faith in the brand. Perhaps the most pleasing point is that Adobe acknowledged the fact that my experiences had highlighted a problem with Product Support that required attention, and the process of rectifying the deficiency was underway. If that results in a more effective, more meaningful, more focused level of customer support then that can only be a good thing for everybody."



Somewhere in the mist, customer support for software incompatibility is lurking...

ROME WASN'T BUILT IN A DAY

Stuart Boydell of Coburg, Victoria, was looking forward to his local telephone exchange being enabled for ADSL2+. After speaking with an iiNet sales rep and being told that Coburg was on the list to be upgraded, Stuart signed up. However: "On several occasions, the advisory date was pushed back and in the interim, iiNet has increased my monthly base charge by $20. . . Finally, after checking a few weeks ago, the advisory page shows that plans for an upgrade of the Coburg exchange are proposed but there is no longer an advisory date. . . My feeling is that by having a proposed date on their web site, they have misled me into believing that the exchange would (some day) be upgraded. Now I know how users in the country must feel when trying to access broadband. Only thing is, this is metro Melbourne!"

We passed Stuart's comments onto iiNet to see what the go was with the ADSL2+ rollout. Mark White, chief operating officer, told us: "iiNet has been installing new DSL exchanges since 2004. Since the very first exchange, we've been struggling with feedback that either told us we were providing too much information or too little. It is a challenge to balance a desire for information about proposed work, without setting unreasonable expectations." Although differing with Stuart's account on some of the schedule particulars, Mark conceded that, due to a number of issues with the build, Coburg had stalled: "This sort of delay is disappointing to us, as we are really keen to get customers onto our network as soon as possible [but] the process is a complex one and no two exchanges are alike. . . All this is little solace to those customers 'hanging-out' for high-speed broadband and having to wait for it to arrive, but I hope you understand we don't just open a carton and switch it on. . . The Coburg exchange is still on our program, we'll let customers know when services are available and we will be extremely happy when customers like Mr Boydell are surfing at full speed. That's the way the internet ought to be."

ADSL2+ rollout is a long and complicated process, as one *APC* reader found out to his dismay. . .

BACK UP OR BEWARE!

Hi guys, a friend told me to email you and get the word out after my experience with HP support staff. My laptop was playing up and is still under the one-year warranty, so I gave HP a call and they put me through to a guy in India who I explained the problem to. He talked me through various steps, telling me I needed to update the BIOS driver etc. I understood none of this but trusted he knew what he was doing so I followed each step. After I completed this, the laptop was unable to even boot. He then tells me I need a new hard drive and to take it to an HP centre, and when I ask him about the contents of my current hard drive, he tells me the warranty will not cover this and I'll have to take care of recovering what I can before HP fixes the laptop. I called back soon after and explained that before I had spoken to the support staff, I was able to access everything on my hard drive and shouldn't it be their responsibility to recover my files as THEY WERE ALL THERE A MINUTE AGO? I was passed from department to department, all of which told me there was nothing they could do. My laptop is currently at my local repair centre where they are hopefully recovering my files. I'm just hoping I get some sort of working computer back before I go back to uni next week.

Rosie Cintio
Wentworth Falls, NSW

Watchdog forwarded Rosie's complaint to HP to see what they had to say:

Dear Watchdog,

Thank you for the opportunity to respond to the customer letter from Mrs Rosie Cintio. HP prides itself on providing the best customer experiences at all times and we constantly review our procedures to ensure we maintain a high level of service at all times. We have been working with Mrs Cintio to bring this case to a satisfactory close. We have replaced the hard drive and keyboard under warranty.

Standard warranties cover the replacement of most hardware components should they fail prematurely; however, they do not cover data or retrieval of data. HP's standard Terms and Conditions clearly encourage all customers to vigilantly back up their critical files to prevent loss of data. Invariably from time to time our technicians need to reformat a customer's hard drive. This process can result in data loss and therefore they will suggest to customers that their hard drive should be backed up to avoid any loss.

Brad Swiney
Public Relations Manager
Hewlett-Packard Australia

We got in touch with Rosie to see what she made of HP's response. She confirmed: "HP has replaced my hard drive (and keyboard, which I didn't ask for but was nice) and my laptop is now working fine. An HP representative called me a few weeks ago after you got in contact with them, being awfully nice to me and making sure everything was OK. In short, I have no complaints with the repair service to my laptop, just the initial lack of warning concerning damage to my system and the general lack of communication skills provided by customer support staff. Thanks for taking the time to follow this up."

watchdog@acpmagazines.com.au

Has an IT vendor or telco stuffed you around? Let us know about it and we'll chase them for a solution on your behalf. Letters sent to watchdog@acpmagazines.com.au must include the writer's full name, street address, suburb, state and phone number to be considered for print publication (please also include details such as invoice numbers and people you've spoken to). Address and phone details will not be published. All correspondence becomes the property of *APC* and is subject to editing.

Linux frustrations

Many *APC* readers are keen to try Linux (or already use it), but it can cause as much frustration as enthusiasm.

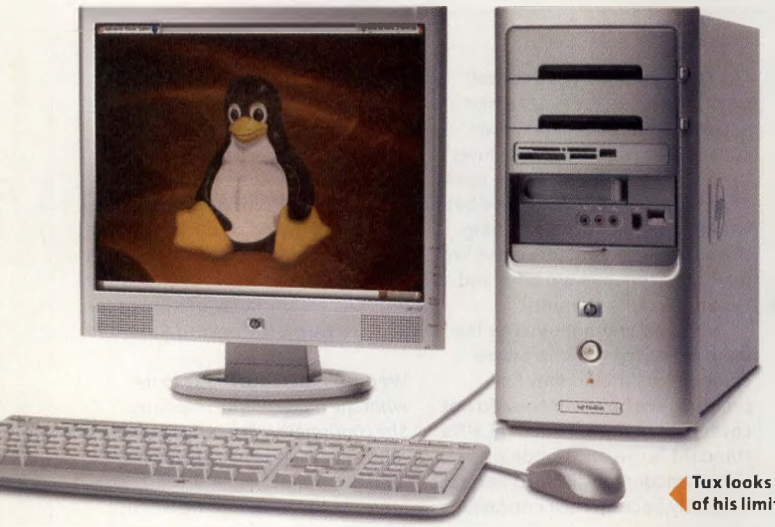
LINUX 1

I've been reading your articles about Linux becoming a valid desktop OS. I am considering Linux as an alternative but the only thing really holding me back is the lack of support, especially in the gaming arena. The main use for my home PC nowadays is gaming. As far as Linux is concerned, on a standard install of even Ubuntu, I can't just put in my game CD and have it run out of the box. Until Linux can get off-the-shelf programs to install with the ease of Windows, it's not going to get the small business or home markets either.

With emulation you can run a lot of Windows-based products and games, but this emulation is limited as it usually requires a Windows installation on the machine in order to pull the necessary code, negating the reason for the switch to Linux in the first place.

It comes down to software developers willingness to support two operating systems with their products. Business apps are quickly coming over, but us gamers have a lot longer to wait until Linux is really ready to take over our desktops! I just hope it's soon, as it looks like Microsoft is doomed to write even more bloated OSs in the future, as they don't seem to learn from their mistakes.

Aaron Herbert
Bayswater North, Vic



Tux looks real cute until you realise some of his limitations — but is Linux at fault?

LINUX TIME WASTER

Yet again, I have wasted more hours of my life trying Linux. Having read the *APC* November article on Linux distributions, I tried to use the distros on the November 2007 cover DVD — and also the 'Editor's Choice' — PCLinuxOS 2007.

Can I make a few observations and comments?

1. Let us assume that at least 50% of your readers use Windows — it may be as high as 80-90%?

2. Let us also assume that most of these users are using Windows XP or Vista.

3. Virtual PC 2007 is a free download for XP and Vista. Despite the 'warnings', it works fine on XP and Vista Home Premium.

4. I am not going to nuke my working Windows machines to try Linux.

5. I am perfectly willing to try any Linux distro under VPC 2007.

And yet, here is the problem: neither distros on the November 2007 DVD work under VPC 2007.

PCLinuxOS installed first time — after choosing the correct video option — including video, keyboard and mouse support. However, there is no sound. A few months ago, I spent hours of my life hacking Ubuntu 7 to get the video, mouse and sound card to work under VPC 2007 — only to listen to the sound card 'break up' when playing audio files.

letter of the month

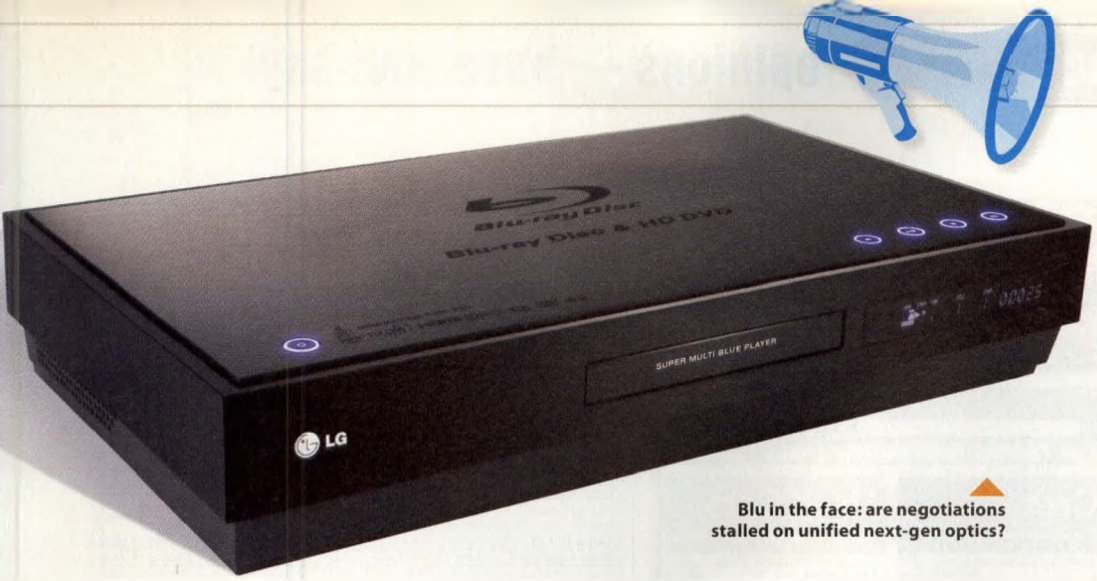
SPAM IN FIREFOX

I read with amusement the article on page 11 of the December issue of *APC*. So online business are thinking of blocking users who use Firefox? This is no more than cutting off your nose to spite your face and shows the short-sighted thinking of these people. These ads are, so far as I am concerned, no different to the advertising garbage that enters my letterbox and gets no further than my garbage bin, unread, and no different to the spam phone calls received on my telephone trying to sell me something, calls that I hang up on within the first few seconds, and no different to the advertisements that do not even gain a glance as I peruse the pages of a newspaper or magazine.

"They" complain about the amount of spam that circulates the internet in emails and take every step to stop that entering their systems, but do not hesitate to inflict yet another form of spam upon the person browsing the internet and have the audacity to complain when we block them. Hypocrisy takes many forms, and this is just one more. And blocking the ads is theft? What kind of warped thinking is that? So far as I am concerned, these ads are theft — they are stealing my bandwidth, they are slowing down my access to the things I want to see — they are, in short, costing me time and money. I am forced thus to pay for something I do not want. Perhaps we Firefox users should gather together in a legal class action, charge these business and make them pay us for the privilege of allowing their spam to be displayed upon our screens.

Romane Takkenberg
Redlynch, Qld

Romane wins this issue's Letter of the Month prize, a Logitech Cordless Desktop MX 3200 Laser keyboard and mouse set valued at $199.95.



Blu in the face: are negotiations stalled on unified next-gen optics?

Installing any version of Windows — 95 and up — under VPC 2007 is a painless experience. In short, it is impossible to use any Linux distro 'out of the box' under Virtual PC 2007. It is simply not acceptable for the Linux community to say that "VPC emulates old hardware such as SoundBlaster 16". Linux should learn from Microsoft and IBM, who both maintain "backwards compatibility."

The day that (a) Linux installs clean in VPC and (b) has all the functionality that I use in Windows will be the day that I may consider switching to Linux. Until then, why should I bother?

Mike Le Voi
Brisbane, Qld

UNIFIED BLU-RAY AND HD-DVD

In response to Ken Needs' very smart suggestion of combining the Blu-ray and HD-DVD standards, it's already been tried. Back in August 2005, talks between Sony and Toshiba (the two biggest players on each side) on a unified next-gen DVD format were finally called off after they failed to agree on a platform for interactivity. Blu-ray wanted a Java-based platform (now BD-J), while the HD-DVD mob opted for Microsoft's HDi. Another huge factor was Sony not being too fond of the royalties it would have to pay.

Fortunately for consumers, there are many manufacturers that support both formats, LG being the first that comes to mind. As the format war draws on with neither side yielding, maybe negotiations will begin again to develop a hybrid format, because there are some great features on either format.

Wayne Sebbens
St Lucia, Qld

PRINTER PRICES

I'm curious about the strategies on pricing that printer manufacturers have been adopting recently. I bought a very nice HP inkjet printer for about $300 about three years ago. It uses four ink cartridges that individually cost about $70 to replace. Not so long ago I happened to empty all the cartridges more-or-less simultaneously.

Are we now at the stage where it's potentially cheaper to throw the printer away and just buy a new one when the ink runs out? I seriously considered it before deciding that the inconvenience of setting up a new printer wasn't worth any small amount of money I might have saved (and the printer already does all I want of it so I'm not looking for any new features).

Furthermore, if the new printers are so cheap, what's their durability like? I'd be willing to bet that fine little printers like the original HP Deskjet, made circa. 1990, would still function perfectly well today after nearly twenty years; they were built tough for all their simplicity (of course you wouldn't want to use one nowadays; their graphical printing speed was glacial at the best of times!)

What's the expected lifespan of one of these new $90 wonders? And at that price, should we care?

Bruce Probst
Orica Australia

WINDOWS OEM

I am a system builder. Various people know of my ability to build a top-notch system at a reasonable price so they ask me to do so. Recently a small business needed the small business version of Microsoft Office 2007 installed. The owner had previously used Office 2000.

I bought all the components, built the box, then installed Windows OEM XP. Microsoft advised that I would not get the disks for the Office software but a certificate with a serial number, which I paid for.

Little did I know what a crazy system Microsoft had put in place.

To be able to install Office Small Business 2007, you first need to download a trial copy from Microsoft, then you also need to register with Microsoft as a system builder, then it seems they will send you a system builder's disk for this program, if they approve, which could take weeks. Then, if you're not screwed by another provisional problem, you may

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A prize on our head: one reader says, "What's with all the awards being given?"

chat
by
Peter Dockrill
THE SOFTWARE THAT WASN'T THERE
The Guardian's Guy Kewney wrote recently about a software developer, Andy Brice, who devised a software utility called 'AwardMeStars'. Only, it wasn't a software utility: it was just a plain text file masked as an executable. As Kewney put it: "Just to make it clear: it won't work. It doesn't work. It was created as an experiment to see how many shareware awards it could receive." And receive awards it did. AwardMeStars – love that name – won awards from 16 of the sites to which it was uploaded. Brice even received notes of encouragment and recognition from site owners. Why? Because of the free publicity download sites can stand to receive by lavishing praise on virtually every product – real or not – that passes under their radar. Of the 1,033 sites Brice approached, only 421 rejected AwardMeStars. The upshot: next time you're trawling shareware sites for that sought-after app or patch, just bear in mind that not everything you see has been exhaustively tested. (Or tested at all. . .)

Before and after: web advertising can be a real headache (and download-allowance hog).

actually be able to install this infernal program with Microsoft's blessing.

It seems that the customer's convenience is completely ignored. I wonder why they impose this crazy system on us. I believe Microsoft are putting all system installers offside and there are millions of them, so it's going to affect their bottom line

Peter Smith
Carlton, Victoria

TOO MANY AWARDS

In your December 2007 issue, no less than six of the ten notebooks being reviewed received your Editor's Choice or recommendation. This defeats the purpose of having awards. Furthermore, in the same issue, Peter Dockrill in your 'Chip Chat' section comments on a piece of software that did nothing but receive awards — not the same thing I realise but I still found it amusing.

Wallace Turner
Palmyra, WA

BUY VISTA

You can buy Vista Ultimate DVDs on eBay and it is rare for any of these sell for more than $250 delivered — a big saving off retail. Some of the sellers are legitimate computer dealers, stating that "you agree that you are a system builder". I phoned Microsoft. I asked about a really cheap upgrade DVD listed on eBay. It had been activated previously, but this upgrade is technically a 'retail' DVD and the licence is transferable.

Microsoft's response was that if it would not activate they couldn't (read wouldn't) help. If you had purchased an OEM DVD the bad news was that you were on your own.

Now, if Microsoft has banned selling OEM disks unless with a new system, where do these eBayers get these DVDs to sell in the first place? These are genuine Microsoft products. I think Microsoft has a nerve to force this activation regime down its customers' throats and then deny responsibility when Microsoft sells OEM product to re-sellers who on-sell in various markets. Microsoft must know this is happening.

They will not help the poor consumer who may, after what they believe to be an honest transaction, end up with a version which will not activate. If it won't activate you're on your own — you have to buy a new licence.

Why is it always the consumer that is left out in the cold ?

Ross Mcleod
Caloundra, Qld

FIREFOX BLOCKING

I have been reading the ongoing controversy about the Firefox add-on that blocks ads, so advertisers are trying to ban it or put in code to block Firefox altogether. I fully understand what advertisers are saying but denying me the right to block their ads is completely stupid. Let me put it this way, I get charged for my internet connection for which I get an allowance of usage data that is being eaten up by ads!

Are you (the advertisers) going to pay for the extra usage I download because of you ads? I think not.

Stephen Hogarth
Windsor, Qld

ADVERTISING NOT A BUSINESS

Reading the article in your December issue "Firefox Killing Web" has confirmed for me what I have suspected for a while — that we are well on the way to another tech bubble (or Web 2.0 bubble, if you prefer). Do people ever learn? Selling advertising is not a business model, it's a pathetic way to try and sustain yourself by hocking the wares of those smarter than you. I applaud Mozilla and the developers of Adblock Plus for helping me get more miles out of my internet connection, instead of wasting it downloading ad material. If the only way you can keep your business running is by selling the one thing that consumers don't want, then you shouldn't be in business.

Blake Walters
Narangba, Qld

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APC BUYERS GUIDE

Grab yourself a copy of our new annual special in which *APC* magazine's experts pick the best tech gear for you.

From notebooks to high-definition TVs, it's all in the most comprehensive tech buying guide in Australia.

Best of all, the products in the Guide have been tested in *APC's* independent, world-class Laboratories. It means you get impartial advice and tips to help you make the best possible buying decision.

From the people behind the world's longest-published computer magazine*

* APC launched in May 1980 and is still Australia's premier authority on computing, as well as the world's longest-published PC magazine.

ON SALE NOW!

This month in Labs. . .

Unpolished Gems

Newly released hardware and software often have problems. It's all to do with the complexity of the manufacture, the limited times given to properly test the products and the tight margins in the majority of the industry.

We often receive workshop samples, pre-production units, betas and even prototypes of equipment so we can align our print lead-times with the launch of a new technology or product. I can understand it when things don't always work as they should, after all, there's time to polish the product (and we do examine TODO lists, known bugs etc., to ensure we're working on the same page as the end user). We take it into account and work around the issues.

What isn't acceptable is when you, the buyer, often act as beta testers for very expensive products. This hit home recently when I was playing Hellgate: London, advertised as Vista compatible, DX10 ready and the be all and end all of desktop entertainment. None of it which was true. The game was buggy and almost unplayable — even when I switched back to an XP installation and wound every setting back to try to find a spot. I gave up after a week and have not looked at it again.

But it's not just the games industry that messes up. When Vista first launched, Adobe's Reader application was updated and marked Vista-compatible. Too bad nobody tested the installer, which was painfully non-Vista friendly and refused to install Reader at all. The install application attempted to run an executable from a directory where it's forbidden. This change was well and thoroughly documented, no gotcha-style bug.

However, these are two quite different scenarios. In the case of Adobe, it took a few weeks to sort it out, repackage Reader and let Vista users read PDFs again. No harm, no foul, except for a few folk switching to another free product that does the same thing. But in the Hellgate, pushing the software out the door before it was finished has done irreparable harm to its business. As it's a subscription-based online game, alienating customers who could potentially give you money every month is a good way to quickly go broke.

The moral of the story is this: as PC users, we're sick of acting as beta testers for software. If a program isn't quite done when it hits the shelves, then you've failed as a developer. Hold off, spend a little more and finish the thing!

> IF A PROGRAM ISN'T QUITE DONE WHEN IT HITS THE SHELVES, THEN YOU'VE FAILED AS A DEVELOPER

NICK RACE – TECHNICAL EDITOR

NOISE FIELD

You can't get many gizmos for under $100 that will transform your PC experience, but speakers are one of them. Creative's new T-Series desktop speakers start at $69.95 for the Inspire T10, which gives you bass and volume controls, headphone port, dedicated tweeter for high notes and an AUX port. The kicker though — they're magnetically shielded, so no crunchy sounds.

www.au.creative.com

INSERT NAKED PUN

VoIP and mobile users can finally go 'Telstra free' with new 'naked DSL' broadband plans being rolled out. iiNet is leading the charge, offering ADSL2+ internet and phone service for $49.95 — and no monthly rental for the telephone line. You get 4GB data and free local and national calls (fair use policy applies).

http://iinet.com.au/

DELL XPS ONE

Is it just us or do the current crop of all-in-one desktop PCs remind us of the Apple iMac? Last month we brought you Sony's Bravia inspired effort, now it's Dell's turn with the XPS One. It's a stylish wide-screen job, with a single cord out the back and integrated wireless, slot-loading DVD and integrated TV tuner and remote. No word on when it will appear in Australia, but keep your eyes peeled.

www.dell.com

Spider: Phenom's four cores and the potential for quad CrossFire are the source of its eight-legged name.

apc FIRST TEST

Gigabyte GA-MA790FX-DQ6

Is the Spider the heart of the world's best desktop computing?

CONTACT Gigabyte
ONLINE www.gigabyte.com.au
MARKET Everyone
PRICE $439

✔ Quad CrossFire solution.

VERDICT ★★★½☆

✖ Still not as fast as competitors.

Thanks to the purchase of graphics outfit ATI last year, AMD claims it is in a unique position to supply a full suite of high-performance parts — chipset, processor and graphics. This, AMD adds, gives it an unparalleled ability to deliver a highly optimised and stable desktop PC platform. But is it true? (For more on the quad-core Phenom CPU, see page 31).

At the heart of AMD's Spider platform is the new 7 Series motherboard chipset. Previously known as the RD790, this is AMD's first chipset based on power-efficient 65nm process technology. Three versions — the 790FX, 790X and plain vanilla 790 — cater for enthusiast, performance and mainstream markets. All share the same basic features/technologies.

First up is the introduction of the PCI Express 2.0 interconnect. The main benefit here is the doubling of bandwidth to data-hungry peripherals, most significantly graphics cards. A significant move in the context of the 790FX's support for anything up to four ATI graphics cards running in CrossFire multi-GPU mode. AMD claims that quad CrossFire arrangements can deliver 3.2x the performance of a single card. That sounds good, and is no doubt true in certain circumstances.

However, the take-up of multi-GPU solutions has been pretty pitiful — just 0.41 per cent of the market in typical gaming PCs, according to one recent survey. That's largely because of the patchy performance, usability and reliability of both ATI's CrossFire platform and Nvidia's competing SLI technology. If gamers are reluctant to hook up a pair of GPUs, you already have to wonder whether a quad-GPU solution is a realistic proposition.

Of more tangible benefit is the official unveiling of the AM2+ CPU socket. The new Phenom quad-core chip is backwards-compatible with existing AM2 motherboards. But, several Phenom features, including HyperTransport 3.0 and the split-plane power management, require AM2+ for full exposure. The former delivers a big boost in I/O bandwidth to 5.4GB/s. The latter giving better control over power consumption when the system is idling or experiencing low workloads.

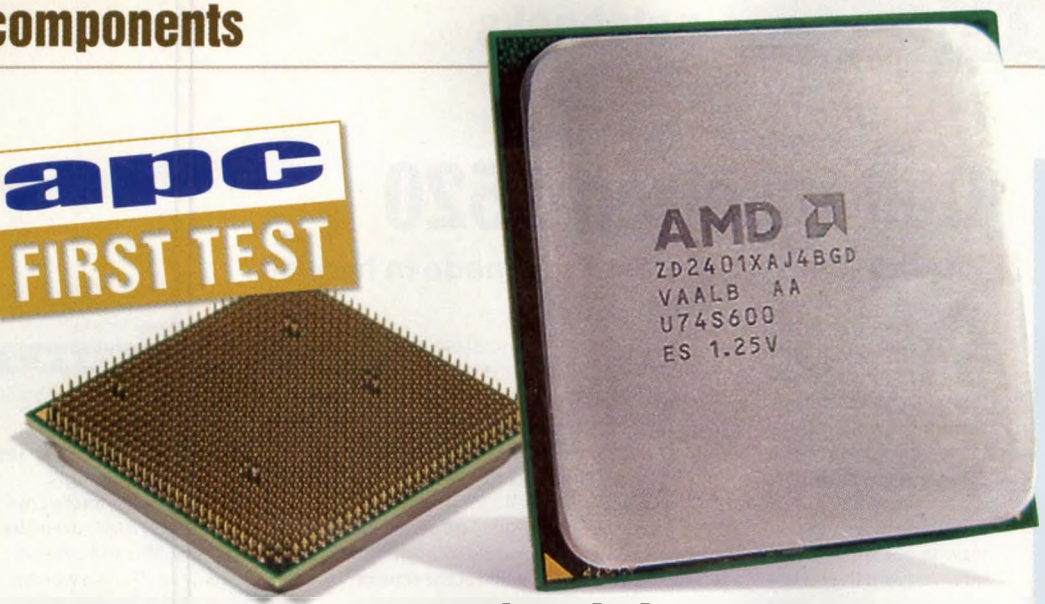
Take this 790FX-powered board with a 2.4GHz Phenom quad-core processor and a pair of Radeon HD 3850s running in CrossFire mode. Then compare it to a 45nm Intel Core 2 quad-core processor running at 2.4GHz on Intel's latest X38 chipset, also with 3850 graphics board in CrossFire mode. The result? The 790FX is not too far behind, but does lose out in the majority of tests, including video decoding, PCMark, Cinebench rendering and classic Super Pi-style number crunching. We suspect most of the blame for that is due to the Phenom processor. However, the fact that the Intel platform outpoints AMD in 3DMark06, despite running a pair of ATI graphics boards, is embarrassing.

Nevertheless, if you are in the market for an AMD-based board, the MA790FXDQ6 certainly doesn't lack for features, including all-solid capacitors, HD audio with low signal-to-noise rating and plenty of BIOS options. With 42 PCI Express lanes and four PCI Express graphics slots, quad-CrossFire is also on the menu.

The final and most impressive product AMD has launched this year is Overdrive. It's a comprehensive system-tuning and overclocking tool, and the slickest of its type. Overdrive is a Windows-based application that gives users access to a full range of chipset and CPU tuning options. Everything from memory timings and CPU clock frequencies to voltages and bus clockspeeds can be monitored and massaged. It removes the need to tamper with BIOS settings and is bound to be a hit with enthusiasts. Overdrive also caters for nervous users with an auto setting.

Jeremy Laird

apc FIRST TEST



AMD Phenom 9700

AMD releases the world's first native quad-core PC processor.

Since the launch of Intel's first quad-core desktop processor over a year ago, there's been a conspicuous hole in AMD's product line-up, but those days are over. Phenom, AMD's crucial new quad-core desktop chip, has finally arrived. Is it good enough to keep Intel's latest 45nm quads honest? Or will the focal point for AMD's shortcomings simply shift from core count to pure performance?

Sadly, the answer is largely the latter. Phenom shares its basic underpinnings with AMD's new quad-core Opteron processors. Moreover, it's a moderate revision of AMD's existing K8 CPU architecture with the maximum core count taken up to four, plus a range of detail architectural enhancements.

The most significant tweak though is the doubling of floating point unit width to 128-bit. That allows all SSE-type 128-bit instructions to be handled in a single clock cycle rather than split in half and crunched into two cycles. Intel's competing Core 2 CPU architecture has offered a comparable capability since mid 2006.

Similarly, Phenom's data fetch width has grown from 16- to 32-bytes, allowing it to handle multiple instructions in a single cycle and boost clock-for-clock performance. There's also HyperTransport 3.0 (only available when Phenom is used in conjunction with the latest AM2+ CPU socket) and DDR2 memory support boosted to 1,066MHz, both in the name of increased bandwidth.

CONTACT	AMD
ONLINE	www.amd.com
MARKET	Everyone
PRICE	N/A

✔ Native quad-core with good scaling.

VERDICT ★★★½☆

✖ Low clock speeds.

AMD has added a 2MB pool of Level 3 shared cache memory, to be shared dynamically or monopolised by a single core, according to workload. Finally, Phenom packs the latest revision of AMD's Cool 'n' Quiet power management technology, with split power planes for the memory controller and Northbridge on the one hand and the execution cores on the other. Both features give AMD more flexibility for minimising power consumption according to workload.

Phenom sports essentially the same instruction pipeline and the three-issue width design as existing AMD CPUs. The architectural carry over means the memory controller and HyperTransport bus remain on-die. That's an enormous benefit in terms of bandwidth and latency, both critical in the context of data-hungry, multi-core processors.

As with every other multi-core AMD processor, this is a single-die chip and the world's first true quad-core desktop CPU. Intel's quads, by contrast, are composed of a pair of dual-core dies sandwiched onto a single CPU package. On paper, the advantage of AMD's approach involves bandwidth, latencies and multi-core performance scaling.

The final static feature is the 65nm silicon manufacturing process. AMD's 65nm dual-core processors are hot and power hungry. So the disappointing 2.2GHz and 2.3GHz clockspeeds of the two Phenom models available at launch, the 9500 and 9600, is not a surprise.

Those figures mean Phenom doesn't stand a chance against Intel's quickest 3GHz+ quads. At 2.4GHz, it also lags behind the latest 45nm Core 2 quad processors for clockspeed by more than 15 per cent. Intriguingly though, the Phenom scales better from one to four cores in the Cinebench render test. This confirms the advantages of AMD's integrated architecture.

We doubt that this chip can match a similarly clocked Intel 45nm Core 2 quad processor in most benchmarks. AMD, therefore, has to compete on value, so expect prices to be reasonable. As all Phenoms are backward-compatible with existing AM2 socket motherboards, you have a painless and affordable drop-in quad-core upgrade proposition. More doubtful is whether you would want to use it as a base for a brand-new system. Survival for the 9700, and probably AMD itself, will be all about pricing. Sold at a discount, the 9700 is an attractive budget quad-core alternative to the usual Intel setup. The only question is, how long can AMD afford to sell its new quad-core chips this cheap?

Jeremy Laird

PHOTO PLAY

High-capacity flash cards are good news for digital camera enthusiasts. The Apacer 8GB SDHC card has room for photos in spades. It uses FAT32 for high capacity, and the Class 6 version (look for the label) writes at 6MB/sec. Remember, you'll need an SDHC-compatible camera. Price: $135.

www.bluechipit.com.au

YOUR PHOTOS, SIR

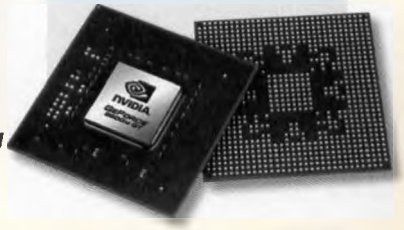
Canon's printing division continues to impress us. Now there's a service to see what your prints will look like before buying the printer. You get to upload one photo per person, and the print is delivered to your door free.

www.canon.com.au/pod

NOTEBOOKS WITH POWER

Are gaming notebooks overkill? Not to gamers — who will be salivating over Pioneer's inclusion of the Nvidia GeForce 8800M in their top-of-the-line notebooks, including the insane quad-core DreamBook Power D90 we covered last month. It won't do wonders for your battery life but will supercharge your DirectX 10 games — and also Blu-ray and HD DVD movies.

www.pioneercomputers.com.au



UPGRADE TIME FOR LINUX?

Fedora is one of the big guns in the Linux world, and the new version 8 has arrived. So is it worth the jump? You get improved Wi-Fi management, OpenOffice 2.3 and updates to firewall and sound configuration. Oh yeah — and a new desktop theme.

http://fedoraproject.org/

MICROSOFT CENTRO

We're all for making servers easier to understand, which is why we're waiting with interest to try Microsoft's new server pack for small to mid-size businesses. Windows Essential Business Server has a pre-configured approach to server installation and a streamlined install process. Will it make server installs quicker? The jury is out.

www.microsoft.com.au

ONLINE MOVIES

And for once it's not the illegally copied kind. CinemaNow has done a deal with Destra to offer online movies (they're calling it 'video on demand') in Australia. Destra says it will launch with 1,000 titles, combining its own independent movie catalogue and 'select' titles from CinemaNow's database. No word yet on costs or what you'll need bandwidth-wise.

www.cinemanow.com

Dell Inspiron 1520

Wireless and Dell — a match made in heaven?

If there's any sign that wireless broadband is gaining momentum, just take a look at Dell's notebook lineup — at the time of writing, a total of 14 of its notebooks came with built-in 3G wireless as an option.

The Inspiron you see here is one of the more reasonably priced ways to get into mobile email and internet, with the review model we saw costing $2,199 (with 3G). It's a typical mid-size 15.4in system, a bit heavy on the scales starting at 3kg, but it's good bang for buck.

Dell offers two official 3G broadband options with its notebooks — Telstra BigPond Wireless Broadband or Vodafone Mobile Broadband. You choose which provider you want during the ordering phase, and your notebook comes with the internal WWAN card preconfigured with that carrier's firmware. The 3G option costs $300 extra, plus you'll need to sign up with the carrier for a wireless account as well.

Dell has tested and certified the 3G wireless module to work with two carriers, while at the time of writing Toshiba endorsed Telstra only for its R400 portable. Dell stresses there's no support if you try using 3G SIMs from other providers, or guarantee that they'll work.

Non-3D performance is very good for the price. We recorded a PCMark05 score of 5,016, which hammers the Fujitsu we reviewed this month (see below).

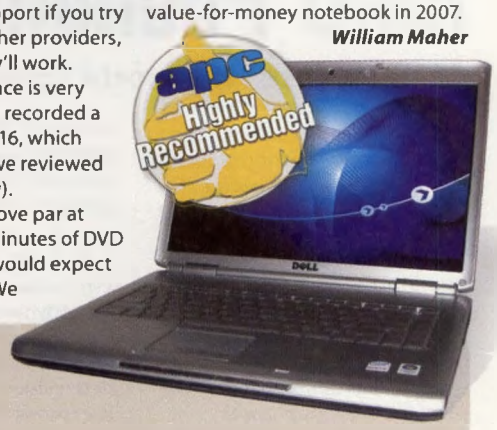
Battery life was above par at three hours and ten minutes of DVD playback, which you would expect with a 9-cell battery. We found the gloss screen hard to see in low-power mode though.

Under the hood is Intel's Core 2 Duo T7500, 2GB RAM, an Nvidia 8800M GT (256MB) and a 160GB SATA hard drive. This is a worthy alternative to the Toshiba A200, which was the standout mid-size value-for-money notebook in 2007.

William Maher

.: CONTACT Dell
.: ONLINE www.dell.com.au
.: MARKET Everyone
.: PRICE From $1,899

✔ 3G option; bang for buck.
.: VERDICT ★★★★☆
✖ Heavy; screen issues on low power.



Fujitsu S6510

Good-value portable computing.

With mobile broadband speeds improving and data costs slowly coming down, the time has come to consider 3G wireless when buying a notebook.

The question is, how much are you prepared to pay? Especially when you consider that you can add a 3G card to most notebooks for a few hundred dollars. This Fujitsu has tri-band HSDPA 3.5G wireless broadband built-in, and while it isn't cheap, you're getting a quality system for the money.

The S6510 has a couple of tricks up its sleeve including a backlit LED screen with a very slim edge. The result is a 14.1in screen (with 16:1 ratio) in what would normally be a 13.3in frame — Fujitsu claims it's handy for opening two business apps at once.

Battery life isn't fantastic, lasting for two hours, 15 minutes of web browsing and some music playback with both Wi-Fi and power-saver mode on. But it has the grunt, and that's where this system stands out from $1,500 machines. A good PCMark05 score of 4,035 hammers the cheap $1,099 LG FS-3 we reviewed two months ago (*APC* December, page 49) as well as Acer's 4920G.

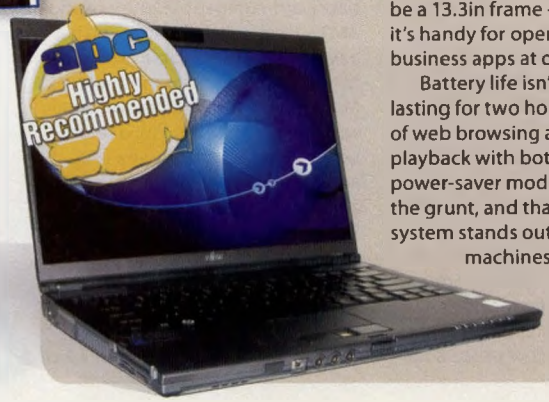
Our review unit included Intel's Core 2 Duo T7500 2.2GHz, 2GB RAM, Intel's current 965 Express chipset platform and it weighs a portable 1.7kg.

It's possible to get cheaper built-in 3G, including Fujitsu's own P1610u tablet — which we've seen advertised for under $3,000. Our advice? If you're addicted to mobile email and web, don't let built-in 3G rule your buying decision. More important is the notebook itself, you can always add 3G later. In this respect, this is an impressive package from Fujitsu, if on the pricey side.

William Maher

.: CONTACT Fujitsu
.: ONLINE www.lifebook.com.au
.: MARKET Everyone
.: PRICE $3,199

✔ 3G; 14.1in screen; fast.
.: VERDICT ★★★★☆
✖ Value for money.



Dell XPS 420 desktop PC

XPS name, without the game.

CONTACT	Dell
ONLINE	www.dell.com.au/pr
MARKET	Performance enthusiast
PRICE	$1,899 ($6,299 as tested)

✔ Great case design; XPS warranty.

VERDICT ★★★★☆

✖ SideShow isn't convincing.

The XPS range of PCs and notebooks from Dell represent the cutting-edge of PC tech. Here in Australia, this has seen Dell selling the desktops to gamers and the notebooks to power users — until now. The new model to hit virtual shelves is the XPS 420, a machine designed from the ground up for video.

As a departure from the giant but impressively monolithic cases of the XPS 700 series, the 420 is shipped in a much smaller case that's closer in size to the Dimension 9000 series. Keeping the BTX form factor for our review model, the 420 gives enough room for expansion without being too monstrous.

There are some other immediate differences between this and Dell's standard desktop towers. The 420 includes a recessed area on top of the chassis with a rubber mat, designed for placing portable tech like cameras and MP3 players when transferring or recharging. It's a little thing, but it makes sense.

The second major difference is the inclusion of a Windows Vista SideShow interface. This small LCD set in the upper part of the front panel allows users to access Gadgets without resorting to the keyboard and mouse. The SideShow system is capable of presenting your emails, weather and stock presentation, along with basic control of Windows Media Player and other, yet to be developed, uses. The problem with SideShow is that the system needs to be on to access and use this information or control. And if it's on, why not use the keyboard, mouse and monitor?

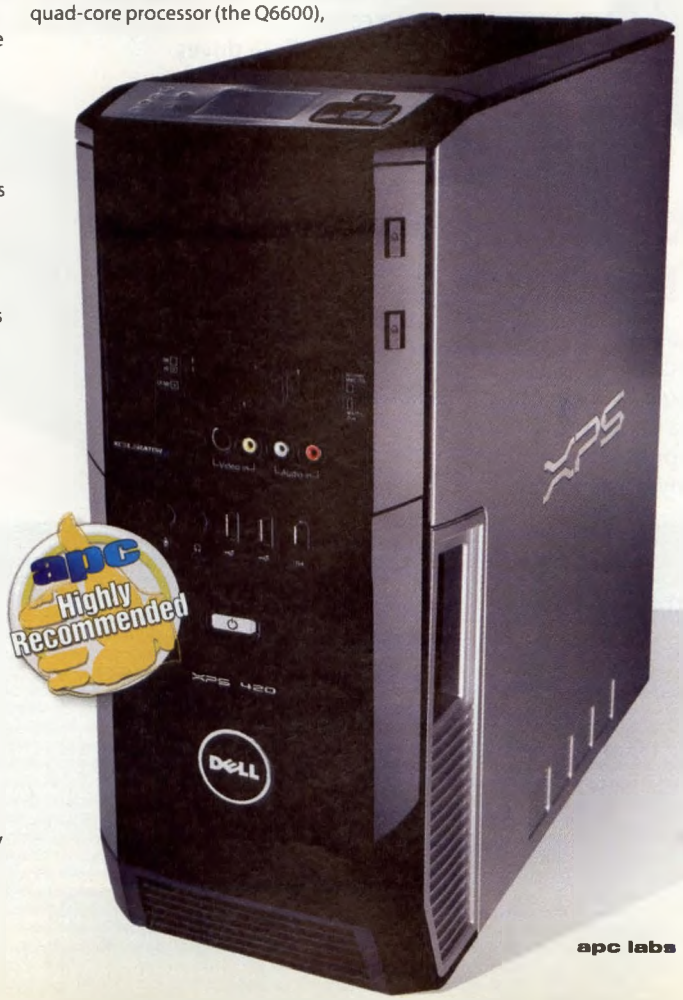
Another key difference is the inclusion of Dell's Xcelerator tech, a video encoding hardware solution with front-mounted composite inputs. This is designed to take the load off the default quad-core processor when encoding video. The only issue is that your software choices are limited if you plan on using this add-on. Dell includes Roxio Easy Media Creator 9, which does function with the Xcelerator technology, but if you need this kind of tech due to the quantity or quality of the video you're encoding, you're probably not going to use Easy Media Creator anyway.

The demo model sent to *APC* was powerful. It was equipped with an Intel Extreme Edition Core 2 Quad X6850, with 4GB of RAM and two 500GB hard disk drives in RAID 0. Rounding out the submission was an Nvidia 8800GTX 768MB, PCI-E Hybrid HD tuner card, Sound Blaster X-Fi Extreme Gamer soundcard and a Blu-Ray drive. The memory heavy hard disk drive leaves the total available memory at 3.25GB, so if you're choosing a build with the 8800GTX you might save a bit of cash sticking with 3GB of memory.

The basic model of the XPS 420 comes in at under $2,000 including a quad-core processor (the Q6600), 2GB of RAM and an ATI HD2600XT with a 20in widescreen LCD — a good deal and a very upgradeable machine including Dell's XPS supercharged warranty. This SKU doesn't include the SideShow machine though.

On the bench the XPS 420 did very well. It's surprisingly quiet for such an over-the-top build, while posting a respectable score of 5,144 in PCMark Vantage. Would we buy one? Not in the high-end configuration. But the entry level offering is a great deal and you can save some money on the questionable benefits of the SideShow screen and the Xcelerator video renderer offer.

Nick Race



apc Highly Recommended

SUN MYSTERY

It may be the kind of tech that mere mortals can only dream of, but IT geeks working in Sydney and Canberra may have gotten a glimpse recently of a mysterious big black box with a Sun logo on the side. The re-fitted shipping container is one of Sun's mobile 'Blackbox' datacentres — a mobile container that can store up to 250 servers and 1.5 petabytes of storage.

WIRE FREE

Mobile broadband pricing is now less painful, with Vodafone recently offering a 5GB for $39-a-month promotion. While the offer may be over by the time you read this (it was advertised as available till the end of December), it's one of several signs that prices may be easing. As we reported on apcmag.com, Optus has also launched a 2GB for $40-a-month plan, plus extra for modem.

SENT FROM THE BUS

Mobile email addicts can look forward to an upgraded BlackBerry, with an upgraded camera, Wi-Fi, preloaded Windows Live Messenger and an upgraded interface. It's been dubbed the Pearl 2, and as we reported on apcmag.com the device comes with a 2MP camera with 5x zoom and flash. Price not available at time of writing.

www.blackberry.com

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Subscribe or renew your current subscription to ***APC*** today for your chance to **WIN** one of **18 Belkin Connect & Protect packs** containing **1 x Extreme Surge Protector** valued at $179.95 and **1 x Hub-to-Go** valued at $89.95!

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Two ultra fast USB hubs in one. Now it's easy to take to the road! Connect your larger, more stationary equipment, such as printers and hard drives to the 3-port base. Then use the detachable 4-port travel hub as a connection point for your mouse, MP3 player, camera, or flash drives.

BELKIN

Belkin 8-Way Extreme Surge Protector

VALUED AT **$179.95**

Power related problems are the number one cause of damage to equipment and lost data. Belkin surge protectors are built to the highest standards and are backed by a genuine lifetime warranty that covers the surge protector and any equipment properly connected to it.

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If the subscription is a gift, only the gift recipient will be entered into the prize draw. 3. The Promoter reserves the right, at any time, to verify the validity of entries and entrants (including an entrant's identity, age and place of residence) and to disqualify any entrant who submits an entry that is not in accordance with these Terms and Conditions or who tampers with the entry process. Failure by the Promoter to enforce any of its rights at any stage does not constitute a waiver of those rights. 4. By subscribing to this ACP Magazines Ltd magazine title you acknowledge that you understand that 'tip ons' and gifts that may be available with non-subscriber copies may not be provided with subscriber copies, depending on the sole discretion of ACP Magazines Ltd. 5. There is a limit of one entry permitted per subscription or renewal to APC Magazine. 6. Promotional period commences 16/01/08 and closes 23:59 EDST 19/02/08. The draw will take place at 11:00 EDST at 54-58 Park Street, Sydney NSW 2001 on 22/02/08. The winners will be notified by mail (using contact details provided in the subscription), and their names published in The Australian on 29/02/08. Promoters' decision is final and no correspondence will be entered into. 7. The first 18 valid entries drawn will each receive a Belkin Connect & Protect pack containing 1 x Extreme Surge Protector valued at $179.95 and 1 x Hub to Go valued at $89.95.8. The total prize pool is valued at $4,858.20. Prizes are not transferable or exchangeable and cannot be taken as cash. 9. If a winner of a prize is under the age of 18 years, the prize will be awarded to the winner's nominated parent or guardian. 10. If any prize is unavailable, the Promoter, in its discretion, reserves the right to substitute the prize with a prize to the equal value and/or specification, subject to any written directions from a regulatory authority. 11. A draw for any unclaimed prizes may take place on 30/05/08 at the same time and place as the original draw, subject to any directions from a regulatory authority. Winners' names will be published in The Australian on 04/06/08. 12. 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MINI HDD

If your USB isn't coping, the next move up is a portable USB hard drive. Transcend has launched a 250GB drive overseas called the StoreJet 2.5HDD that it claims will fit 'comfortably in the palm of your hand', and like all sexy tech, it comes in the metal-de-jour — aluminium.

www.transcendusa.com

RADIO GA-GA

iPod alternatives are getting better by the day. If you're not after video playback (for that we recommend Apple's latest nano), then check out Transcend's T.sonic 650, which weighs an incredible 30 grams with up to 4GB of capacity. One advantage over the iPod? The built-in FM radio.

www.transcendusa.com

LUG THIS

No we're not going Dell-crazy, but we had to mention the launch of the XPS M1530 — a 15.4in version of Dell's cutting-edge XPS M1330, which hammered through our benchmarks, and blew us away with its sleek, light design and value for money. The M1530 takes all the good bits from its cousin, including backlit LED screen, slot-loading DVD, HDMI video output and stonkingly good bang for buck.

Price: from $1,499.

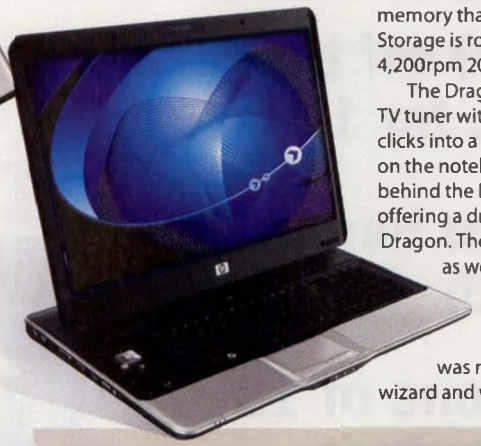
www.dell.com.au

HP Pavilion HDX Dragon

This latest offering from HP is one mighty beast indeed.

Although HP say the Pavilion HDX is a notebook, we beg to differ. With a 20.1in screen, a full-sized QWERTY keyboard and a weight of 7kg it's more like a portable desktop system.

The Dragon is powered by a Core2 Extreme 2.6GHz processor with 2GB of DDR2 memory. The 20.1in display has a resolution of 1,680 x 1,050 driven by an ATI Mobility Radeon HD 2600 XT card with 256MB of dedicated memory that rises to 1,023MB. Storage is rounded out with a pair of 4,200rpm 200GB SATA drives.



The Dragon boasts an integrated TV tuner with a remote control that clicks into a dedicated storage space on the notebook. HP put its weight behind the HD DVD standard by offering a drive as an option for the Dragon. There's a memory card slot as well as four USB ports and FireWire input.

Connecting to a TV is easy, all we had to do was run through the setup wizard and we were watching digial TV. Sound is covered through usual 3.5mm sockets for headphones and a set of outputs for a 5.1 speaker system; and a standard coaxial connector connects to a TV antenna.

As you'd expect there's 802.11g Wi-Fi and Bluetooth. If you prefer to use a 3G or HSDPA service there's also an ExpressCard slot for both 54m and 34mm cards.

There were some disappointments with the Dragon. While the screen is huge, we'd have preferred a 1,920 x 1,200 resolution so HD video could be viewed at its best rather than scaled back. Also, we'd have liked a Pre-N wireless card since some of HP's competitors offer it at lower price points.

Anthony Caruana

CONTACT	HP
ONLINE	www.hp.com.au
MARKET	Everyone
PRICE	$4,999

✔ Large screen; performance.

VERDICT ★★★☆☆

✖ Display resolution; slow HDD.

Shuttle SN68PTG6 Deluxe

An HTPC with a great graphics chipset and gutsy CPU.

This little beauty from Shuttle fits in its "Glamor" range of SFF PCs, but we don't see it. Sure, it looks good, but we're not certain what makes this tiny PC more glamorous than any other Shuttle. Thankfully, it makes a good HTPC.

The SN68PTG6 is built around the Nvidia 630A chipset, supporting AMD Athlon X2 and Sempron processors using a 1GHz Hypertransport link. The CPU is sandwiched beneath one of Shuttle's I.C.E cooling systems, which moves heat away from the chip to a radiator at the back of the case. It supports two slots of DDR2-800 up to 2GB per channel for a maximum total of 4GB.

Graphics for this model is provided by the Nvidia 7050PV graphics chipset, which is built from the ground up for video playback. The chipset supports native HDMI and Nvidia's PureVideo technology, and well suits an HTPC. There's a 16x PCI Express slot for single-width graphics cards, but be careful as you'll need to do some rerouting of the cables to get power to a card that requires it. Also keep in mind that the system's PSU is only 300W, so low power is the way to go.

The SN68PTG6 is also packed with interesting extras: there's a flip-down fingerprint reader and front-mounted USB and FireWire, including a "Speed Link" connection for hooking up two PCs for transferring files. The Shuttle is also packed with Wi-Fi 802.11g and Bluetooth, so it's well equipped out of the box. The Wi-Fi adaptor is connected internally by USB, so if you don't need it consider putting a slim USB key in there for ReadyBoost under Vista.

Nick Race

CONTACT	Altech
ONLINE	www.altech.com.au
MARKET	Everyone
PRICE	$599

✔ HDMI; low noise; lots of extras.

VERDICT ★★★★☆

✖ Weak PSU.

The only downside to LED technology is its wide display profile.

Samsung XL20: Two strips of LEDs replace the CCFLs we're used to in monitors.

Samsung XL20

The days of power-hungry screen technology are numbered.

LED matrix monitors have long been touted as the future of displays. While the advantages over their backlit brethren are numerous, the major improvements you can expect to see are bolder and brighter colours coupled with more uniform panel consistency compared to cold cathode fluorescent lamp (CCFL) monitors.

What's more exciting on the LED front is the prediction that such displays are finally filtering through to affordable models from the likes of NEC and Samsung, and will be hitting the street later this year at prices only marginally greater than those of current top-end LCDs.

So what's all the fuss about? Existing CCFL lamps are based on mercury vapour in glass tubes that aren't as robust as solid-state devices. Although CCFLs do their job admirably — espceially in the high-end panel market — they're prone to unbalanced brightness, have a comparatively short life and are distinctly environmentally unfriendly.

LEDs do away with such worries, and so have been quickly adopted by laptop manufacturers such as Apple. These companies are keen to extend battery life in their products (LEDs use far less energy) and prevent cracks appearing when a portable screen gets a whack.

COLOUR REPRODUCTION

However, the LED's biggest boon is its colour reproduction. Early example monitors, such as NEC's 2180UX-WG display, are aimed firmly at graphics professionals — both in their specifications, producing around 110 per cent of the sRGB colour gamut, and in their price.

In the case of the two existing commercial models — the aforementioned NEC and Samsung's SyncMaster XL20 — the road to colour nirvana is reached by placing a strip of LEDs across the top and bottom of the display. This ensures that not only is brightness and colour reproduction of the utmost quality, but uniformity is 100 per cent balanced across the display. Running a DisplayMate test across an LED monitor proves this, with the display evenly illuminated from one edge to the other.

There are downsides to LED display technology, not least when it comes to their size. Manufacturers still haven't found a way of housing LED technology in the kind of thin-bezel chassis we're used to on TFT monitors, so the examples we've seen are bulbous in comparison to slimline LCD panels.

For home users such bulk may look out of place, but in a professional media environment pro-end monitors have always had an extra-thick rear panel. If the likes of Samsung and NEC want to crack the consumer LED market, finding a way to shoehorn their components into a slimmer casing will be imperative.

Nevertheless, the benefits of LED far outweigh its associated drawbacks. Colour is richer and truer, and the screens are far brighter and more uniform. What this presents is a far more impressive viewing experience, especially with video and games.

The consumer market is ripe for an LED revolution, and when the prices of these monitors fall you can expect to see the end of LCDs.

CONTACT	Samsung
ONLINE	www.samsung.com.au
MARKET	SMB
PRICE	$2,499

✔ Backlight for good colour & clarity.

VERDICT ★★★★☆

✖ No HDCP; not for everybody.

HOW DOES IT LOOK?

At $2,499, the XL20 is the best value LED currently available, and while Samsung has opted for an AU-Optronics A-MVA 20in panel instead of its own, the build quality, chassis and matte screen are to Samsung's customary high standard.

The 1,680 x 1,200 resolution, 8ms response time and 700:1 contrast ratio may seem akin to a normal TFT's, but coupled with blue LED backlighting it results in stunning brightness and colour reproduction.

Its DisplayMate test proves there is 100 per cent even backlighting across the monitor, with no colour patching or degradation. And with RGB, sRGB and a professional-calibrated output all easily accessible from the OSD, all colour-critical options are covered.

Then again, the DVI input isn't HDCP-compliant, though Samsung has said that by mid-2008 it will produce a unit with HDCP support.

Elzo, NEC and others produce pro-monitors in this price range, but none offer the clarity of the XL20.

Tom Dennis

HP FOR THE WIN

Despite some great gear on the market, Dell is copping some tough times as it fights to regain from a slowdown in growth and HP's continued domination. Dell's global market share is reportedly under 15%, while HP is pushing the 20% mark.

PIONEER'S GPS

We're not convinced GPS units work as music and multimedia devices, but the manufacturers don't seem to agree. Pioneer is spruiking the MP3 capabilities of its AVIC-S2 unit. It's certainly small, with a 3.5mm touchscreen and only 24mm thick.
Price: $549.
www.pioneer.com.au

TRI-BAND

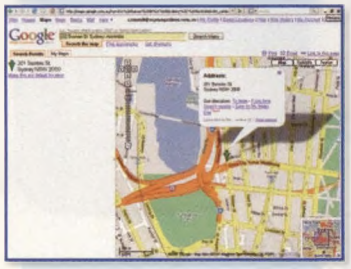
3G wireless is beginning to appear in more notebooks. As well as Fujitsu's S6510, which we've reviewed this month, there's also the smaller tablet-style Fujitsu P1610. Like the S6510 it has a wireless HSDPA broadband antenna, only this time it weighs 1kg with an 8.9in touchscreen. Price: $3,099.
www.lifebook.com.au

THE NEED FOR SPEED

It's not just CPUs that are getting faster. Apacer is boasting first place in the race to pass ATI's CrossFire certification. What does it mean? Its Overclocking Series DDR2 1,066MHz 2GB and 1GB RAM kits are officially OK for gaming PCs with ATI's bleeding edge CrossFire graphics setup. Price: $115 1GB Kit (512MB x 2). ***http://ap.apacer.com/ap/products/Overclocking_Series_Overclocking_Series.htm***

GOOGLE'S NEXT FEAT

Online apps for mobiles are fast taking shape. The hottest rumour at press time was the possibility of a new location function in the handheld version of Google Maps (it checks your position to mobile phone towers.) The rumoured service would be particularly useful on phones without GPS. ***http://maps.google.com/***



VERY REMOTE CONTROL

Recording and watching TV on your PC/notebook/handheld is getting easier. Electronic Program Guides are the latest tool to help browse the 'box' via a computer, and now Foxtel is bringing them to handhelds via a web-based 'remote record' function. The idea is you can tell your Foxtel iQ set-top box to record your favourite show by logging in via your mobile phone. ***www.foxtel.com.au/mobile***

ASUS Blu-ray BC-120SPT drive

ASUS enters the market, but it's not tipping us off the fence.

The Blu-ray and HD DVD battle is still raging in lounge rooms, and both sides will tell you they're winning the war. On the desktop it's just getting started, but users have been much slower to take up arms for one side or another.

Although both of these drives have been available for some time, they're still a rare find in a desktop PC, primarily due to cost and fence sitting users, waiting to see which format "wins". It hasn't stopped the manufacturers though, with Pioneer, LG, BenQ, Lite-On, Samsung, Sony and now ASUS all releasing Blu-ray models on the market.

We took a look at the ASUS BC-120SPT drive, which is a BD-ROM (read only for Blu-ray) combo drive, also supporting DVD±RW at 12x, DVD±R DL at 4x and DVD±RW at 6x. The drive only reads BD-ROM at 1x, so this is purely a Blu-ray playback drive, and not a fast one at that.

CONTACT	ASUS
ONLINE	www.asus.com.au
MARKET	Everyone
PRICE	$349

✔ Decent bundle; performs as expected

VERDICT ★★★½☆

✖ No BD-R, only 12x DVD

This model is SATA. Physically, the drive is short so fitting it in to small cases or small form factor systems when building a HTPC shouldn't be a problem.

It's bundled with a full suite of optical disk software from CyberLink, including software for playback and burning CD, DVD and BD disks.

In essence, this drive is a compromise. It provides BD-ROM support for playback at the cost of a 20x DVD burner, though its performance is spot-on for its stated specs. We've no real complaints about the drive, but we'll stay sitting on the fence.

Nick Race

Belkin High-Speed Dock

Go from laptop to desktop in a flash with this station.

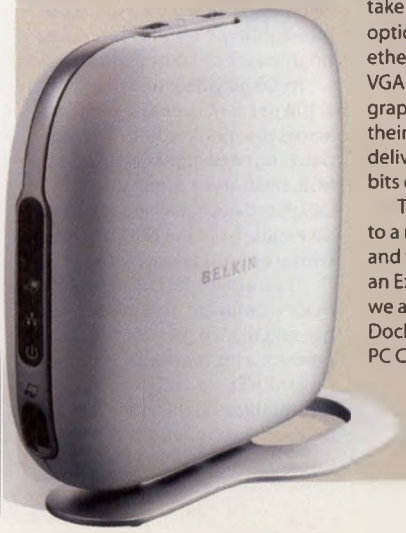
One of the hassles with a laptop is that you want to connect a bunch of peripherals and a screen when you're in the office. Belkin's solution to this is a High-Speed Docking Station which is compatible with many ExpressCard 32-equipped notebooks.

CONTACT	Belkin
ONLINE	www.belkin.com.au
MARKET	Everyone
PRICE	$350

✔ Compatible with many laptops.

VERDICT ★★★☆☆

✖ Limited OS support.



The High-Speed Dock has a port at the front for connecting your PC. That connection lets you take advantage of five USB ports, optical and 5.1 speaker sockets, ethernet, a mic port and DVI and VGA monitor connections. The graphics ports are supported by their own graphics processor that delivers up to 1,600 x 1,200 with 32-bits of colour.

The cable connecting the Dock to a notebook is almost 70cm long and the connection to the PC is via an ExpressCard 32. In the test lab we also successfully connected the Dock to a notebook that only had a PC Card slot.

Setup is a matter of installing some drivers and connecting your desired peripherals. We tested the device with XP and 32-bit Vista — contrary to the packaging stating it's compatible with "all notebooks equipped with an ExpressCard slot", there's no OS X or 64-bit Vista support. The Dock's graphics card doesn't support Aero effects under Vista.

Belkin's software allows you to switch between screen mirroring or spanning modes, meaning you can keep using your laptop's screen and expand your workspace onto a second screen. There are other utilities for managing the LAN and audio connections, allowing you to selectively enable the High-Speed Dock's different interfaces.

If you're looking for a way to easily convert your new laptop to a desktop, this might just do the trick for you.

Anthony Caruana

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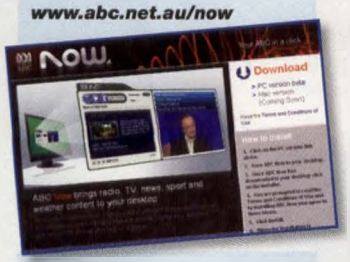
SO RANDOM

We're fans of Summer Heights High, which is why we were curious to see the ABC's new desktop widget, called 'ABC Now'. It gives you one handy place to find ABC podcasts, news headlines and TV downloads. As we pointed out in our report on apcmag.com, you might as well go to the web site, but it's a good idea nonetheless.

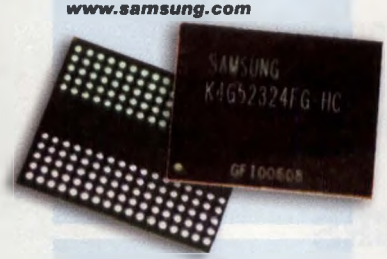
www.abc.net.au/now



FASTER RAM

Faster RAM in the form of GDDR5 will appear in 2008, according to reports that Samsung will spearhead the introduction of the new technology. The upshot? Hopefully faster graphics cards. No word yet on availability or pricing at time of writing.

www.samsung.com



FRAME GAME

Finding a good digital photo frame is hard, especially when there's a lot of little-known brands out there. Transcend has jumped on the bandwagon with this T.photo 710 frame, which has 1GB of internal memory — not bad compared to some models. These guys are big names in flash memory gear, so you at least know they should stand behind their product. You can find transcend products on many local shopping sites.

WD Caviar GP WD10EACS

The next-gen HDs are saving information as well as power.

If we say we know a way you can save a whole $3 each year, you probably wouldn't bat an eyelid. How about 10kg of carbon a year? When it comes to saving power every component has its part to play. That's why Western Digital has taken the step of introducing its GreenPower technology — a bundle of techniques that allow its drive, by its own figures, to save up to 5W over standard 3.5in drives.

There's IntelliPower, IntelliPark and IntelliSeek, which all sound, well, IntelliTastic. Despite the odd names, the areas where each technology provides savings seem to make sense. IntelliPower varies the spin speed of the drive between 5,400 and 7,200RPM. Of course, there's a performance price to pay with a reduction, as this seems to limit the top speed of average transfers.

The other technologies attempt to claw back the odd drop of juice here and there where they can get them. IntelliPark lifts the read heads, thereby reducing drag while the drive spins in idle status. As you can imagine, the energy savings from read head air turbulence aren't that high. The final trick, IntelliSeek, has an even lower impact by smoothing actuator movement to use less power when switching tracks.

WD Caviar GP: Greenness is creeping into every component of your desktop PC.

CONTACT	Western Digital
ONLINE	www.westan.com.au
MARKET	Everyone
PRICE	$559

✔ Power savings...

VERDICT ★★★½☆

✖ ... at the expense of performance.

REDUCED POWER

Western Digital backs all this up with facts and figures (but, alas, no pie charts) and attempts to take the hours per year a drive runs, and multiply it by the price per KW, the average power saving and a power multiplier.

The power multiplier factor is interesting as it attempts to compensate for a number of issues that increase power consumption, such as power supply inefficiency, air conditioning and other cooling requirements. This is because while a drive may draw 10W, it actually has to be supplied with 15W as the power supply could be 66 per cent efficient, resulting in a 1.54 multiplier for some desktop systems. On top of this, environmental cooling bumps the power multiplier to 2.4 in enterprise installations to compensate for the additional heat generated and extra cooling required.

From our own testing compared to a contemporary SATA drive we measured savings ranging from 1W up to 6W. The largest 6W readings came from random access, while burst, read and write readings varied around the 2W and 1W level.

Western Digital always seems to stay in the middle ground — perfectly adequate yet not awe-inspiring. But perhaps the company is playing to its weakness with this one, swapping raw drive speed for energy efficiency.

All the benchmarks show that the WD Caviar GP lags behind the Hitachi Deskstar we compared it to. An HD Tach read and write speed of 66MB/s is behind the Hitachi by 8MB/s on read and 38MB/s on write. It also trails on seek times and all the PC Mark tests. The one bright point is the very high burst speed, but that's just an indication of the interface bandwidth, rather than raw physical speed.

This is more expensive than the Hitachi, but for companies and enterprise users the energy savings will outweigh performance. It depends where your priorities lie.

Cynics could dismiss the Western Digital GreenPower as nothing more than a marketing gimmick. On a subjective level, a single GreenPower drive will make almost no difference to your daily life. But looking at things at the macro level, these tiny savings all add up — with millions of drives produced every year, a couple of watts savings on each drive results in a couple of million watts saved every day, or tens of millions of tonnes of carbon each year. Even at a smaller level, a company using a couple of hundred drives could easily shave hundreds, if not thousands of dollars, off their power bills.

Neil Mohr

Best memory times

DDR2 may be on the way out, but bargains are to be had.

One of the most overused axioms of computing is 'there's never been a better time to upgrade your memory'. At various times over the years it's certainly been true. However, if memory is an area that you haven't paid much attention to lately, you'll be surprised by how much is on offer at such low prices. You can pick up 2GB kits from big-name manufacturers for around $130.

The main factors defining how much you pay are the operating frequency of the memory and the latency involved. The sensible money's on 800MHz DDR2 — also known as PC2-6400 — although if you have a faster system, the 1,066MHz variety (PC2-8500) makes more sense. This will set you back much more though, as much as double that of PC2-6400. Conversely, if you have an older machine that only supports DDR2 667MHz or 533MHz, you can expect to pay as little as $100 for 2GB kit.

What will increase the price of your memory is its latency — the lower it is, the more you can expect to pay. This is because anything faster than the JEDEC specification tends to be aimed toward the enthusiast market, specifically for overclockers.

DDR2 RAM: price tumbles mean you could bag a real bargain.

Such sticks also tend to come with heat spreaders, which are designed to help cool the memory as the frequencies and voltages are increased. Such coolers aren't needed for day-to-day operation, but heat spreaders are the norm for most manufacturers even if the memory isn't intended for overclocking. As with active coolers on motherboard chipsets and low-end graphics cards, you'll find many devices have over-the-top cooling.

TWO FOR ONE

A more welcome move is the shift to providing memory kits as opposed to standalone units. While it isn't hard to pull these sticks off the production line together, the theory behind the kits is that they're guaranteed to work well together in dual-channel configurations. By pairing up, you ensure that your upgrade will operate at the optimal frequency. One serious consideration for any prospective purchase is the looming spectre of DDR3. While its current pricing makes it a niche option at best, it's clearly the way the market is heading, and this makes any DDR2 purchase an upgrade of finite longevity. Keep this in mind when buying, as it could mean you get away with the slower but far more affordable upgrade — and more memory is always going to pay off better than focusing on speed.

Alan Dexter

SMALL BERRIES

With BlackBerry's smartphones getting increasingly fancy — check out the upgraded 8210 with its video and 2-megapixel camera — this software deal might appeal. BlackBerry is offering a special US$499 software package to get small businesses hooked up with mobile email. It's good for five users (upgradeable) and can be installed on the same server you use for email (Exchange or Domino).

www.blackberry.com/professional

NOTEBOOK OR PDA?

Ultraportable notebooks are tiny, but the really small portables are the 'ultra-mobiles' like the HTC Shift at just 800g. It has a 7in screen, wireless options including 3G, Wi-Fi and Bluetooth, but we're disappointed to see Vista installed. Fortunately there's HTC's SnapVue mode, for email, calendar, and text messages. Price: $1,999.

www.htc.com

DDR2 RAM (2GB)

Geil 800MHz Ultra-6400

This Geil memory ticks all the major boxes: it doesn't boast ge-gaws, the timings are decent and, most importantly, it's extremely affordable – $130 for 2GB of 800MHz memory shouldn't be sniffed at, particularly not for a matched pair. Despite the low price, Geil is aiming this memory kit at the gaming market. It doesn't boast cutting-edge performance (4-4-4-12 is unexciting), but the choice of black, basic heat spreaders in brushed aluminium will appeal to those with windowed cases.

CONTACT	AusPCMarket
ONLINE	www.auspcmarket.com.au
MARKET	Performance enthusiast
PRICE	$130

✔ Inexpensive; good performance.

VERDICT ★★★★½

✖ Timings could be better.

DDR2 RAM (2GB)

Transcend AxeRam 800

Transcend has elected to use stylish heat spreaders on its kit, although its actual ability to dissipate that heat is questionable – serious overclockers will need active cooling to help on this front. The central block of the cooler does make the memory easy to pick up though. Again the memory is rated at 4-4-4-12 timings for 800MHz operation, although you're paying slightly more for this memory than the Geil alternative. An extra $5 for a slightly different look alone may not be worth it.

CONTACT	I-Tech
ONLINE	www.i-tech.com.au
MARKET	Performance enthusiast
PRICE	$135

✔ Heat spreaders; good performance.

VERDICT ★★★★☆

✖ Slightly more expensive.

DRIVE CHURN

Hitachi claims to have overcome the problem of noisy hard drives being a distraction during home movies. The new 500GB CinemaStar drives are said to hold about 178 movies and offer improved acoustics.

www.hitachi.com.au

BLU STREAK

One of the big drawbacks with Blu-ray drives is the time it takes to burn so much data. Faster drives are beginning to appear, including LG's Super Multi Blue GGW-H20L which burns Blu-ray discs at 6x and DVD+/-R at 16x. LG drives have made a name for themselves as they can also read HD DVD discs. A good option if you're heading into HD movies. Price: $999.

www.lge.com.au

UNDER WRAPS

External hard drive enclosures — who would have thought there'd be so many features you could pack in. QNAP has gone for a *Mission Impossible*-style theme with its black titanium QBack-35S. You can whack in a single 3.5in SATA drive for up to 1TB storage. Connections include USB 2.0 and eSATA. Price: $99.

www.qnap.com

Lexmark X6570

The Lexmark MFC formula continues.

CONTACT	Lexmark Australia
ONLINE	www.lexmark.com.au
MARKET	SMB
PRICE	$299

✔ Print, photo and colour copy quality.

VERDICT ★★★★☆

✖ Semi-gloss results only.

Lexmark has taken an interesting approach to printers: stand out on the crowded shelves by cramming as many features as possible into very affordable or moderately priced devices.

The Lexmark X6570 is an inkjet all-in-one with fax capability, which can be directly connected to a computer via USB, or shared across a network via its Wi-Fi interface. Features include a 25-sheet automatic document feeder for the scanner and duplex printing, saving the operator time and paper.

Print, scan and copy quality were much as we expected given the price and features of the unit. Some fuzziness was visible when we examined text under magnification, but business graphics were reasonably bright and smooth. Photo printing on plain paper was acceptable, but we remain disappointed by the semi-gloss results on supposedly high-gloss PerfectFinish paper.

Photo quality improved noticeably with the optional six-colour ink cartridge (it replaces the normal black cartridge with black, light cyan and light magenta), significantly reducing red levels in skin tones.

The X6570 can nominally print right to the edges of A4 paper, but we found a margin of approximately 1mm on one long edge and a narrower one on one short edge. When borderless printing was not selected, we saw an unusually wide 15mm border appeared on the lower edge. Full-page colour copies were impressively smooth for a device in this class.

The installer walks you through the physical setup while the software loads in the background. By the time you've removed all the securing tapes, flipped out the trays, fitted the ink cartridges and so on, the software is nearly ready to go. The wireless setup routine was painless but does require a temporary USB connection.

Drivers and software are provided for Windows 2000, XP (including x64) and Vista, plus Mac OS X 10.3 and 10.4 (including Intel). The Windows software includes a utility for scanning and printing (including OCR and conversion to PDF), and the Lexmark Toolbar to assist in printing web pages from Internet Explorer. The Mac bundle comprises printing and scanning software plus ABBYY FineReader OCR.

One quirk of the Windows driver was that the printing preferences window was irritatingly slow to open. Another problem was that the X6570 sometimes failed to reconnect with the Wi-Fi network when waking from low power (sleep) mode, requiring the mains cable to be disconnected for a full restart. Updating the unit's firmware seemed to clear up both issues, though we're not sure why that affected the preferences window.

We would prefer the reference corner of the scanner glass to be at the back of the unit, not the front, as we find this makes scanning books and magazines easier. Network scanning is optionally PIN protected, which is a sensible feature.

When copying, various combinations of one and two-sided originals and copies are supported, though the buffer memory is limited to around six or eight sides of colour A4. The X6570 rotates the second side before printing, so the stack of originals must be returned to the ADF with the reverse orientation to the originals. Not difficult, but counter-intuitive.

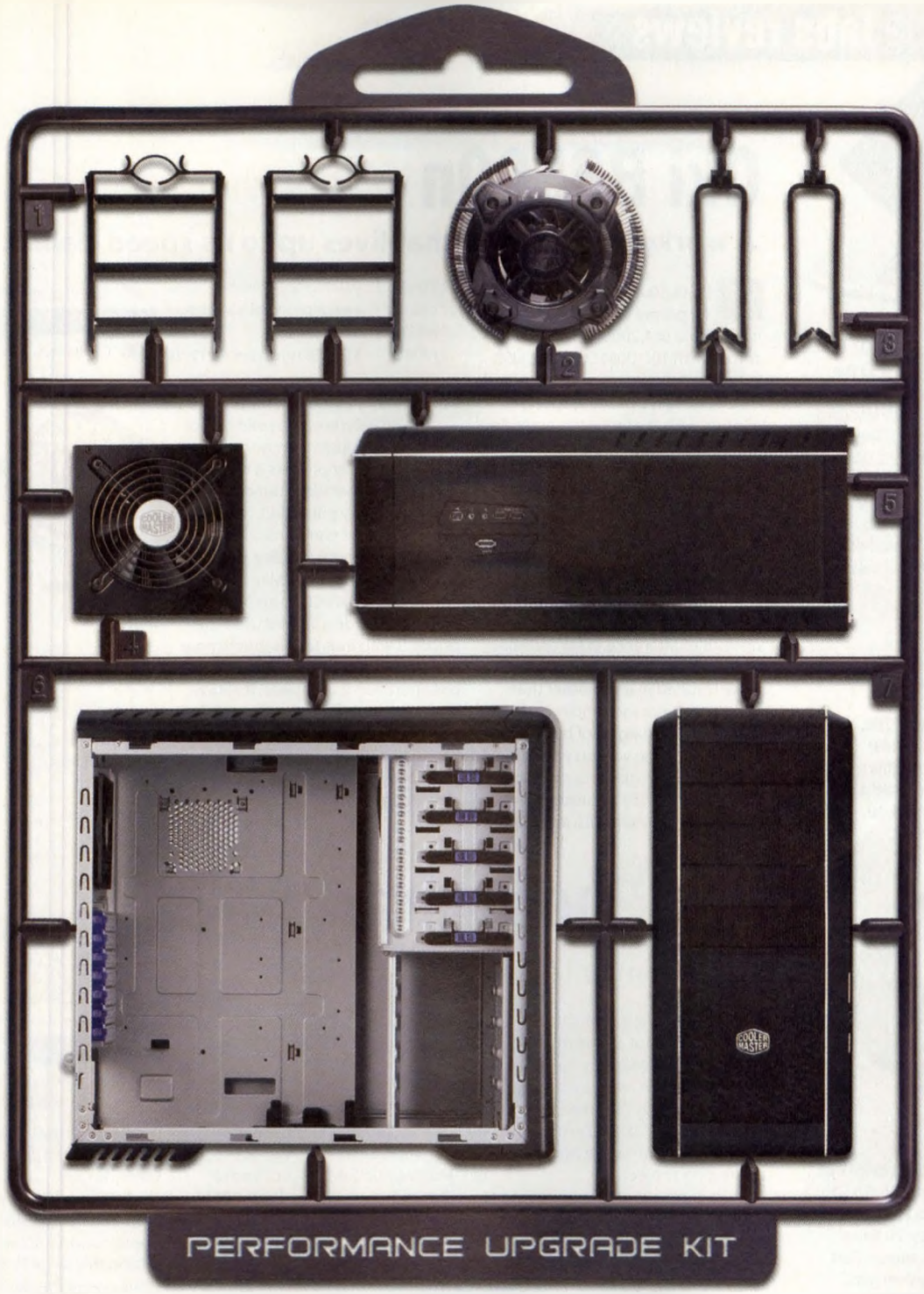
Media cards (SD, MMC, xD, Memory Stick and CF) and USB storage devices are supported (including PictBridge cameras), and the X6570 can print a proof sheet that you mark with a pen or pencil and then scan to automatically print the required images. Images from such devices may be transferred to USB- or network-connected PCs.

Nominal print speed is 24ppm for colour documents and 28ppm for monochrome. We recorded 41 seconds click-to-drop for the first A4 colour page, with the second emerging after 36 seconds.

The X6570 can be used as a conventional fax machine or documents can be faxed directly from Windows (but not Mac OS X) applications. PC-based faxing is poorly documented. A pass-through socket allows the connection of a phone to the same line, and auto-answer can be controlled from the front panel.

Stephen Withers

COOLER MASTER®



CM 690

Set-up Guide:

1. Five removable HDD racks for easy maintenance and system upgrade
2. Shown above, but optional: CM Sphere CPU cooling
3. Unique cable management for tidy interior
4. Shown above, but optional: Real Power Pro PSU
5. Top cover mesh with two 120mm fans greatly enhances system cooling performance
6. **The only mid-tower chassis that is SLI Certified**
7. Stylish front panel mesh allows for consistent stream of airflow

www.coolermaster.com.au

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	Capitol Computer	02 9281 8890	www.capitolcomputer.com.au
	Umart International	02 9745 0877	www.umart.net
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	IT4US Computers & Media	08 8231 7588	www.itforus.com.au
QLD	Computer Alliance	07 3421 3200	www.computeralliance.com.au
	Game Dude Computers	07 3387 1500	www.gamedude.com.au
	Dreamworks IT	07 3396 0544	www.dreamworks.com.au
	Umart Online	07 3369 3928	www.umart.com.au
WA	Austin Computers	08 9201 2788	www.austin.net.au/index.asp
	Trinix Computers	08 9350 1600	www.trinix.com.au
	YNOT Computer Systems	08 9330 7666	www.ycs.net.au
	Netplus Micro Computers	08 9242 7288	www.netplus.com.au

BURN ON THE GO

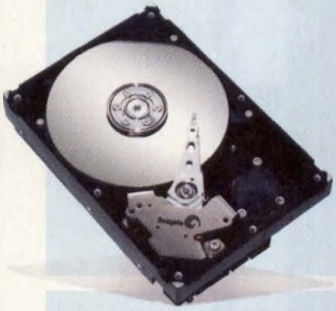
LG's E300 notebook is a 13.3in notebook with a difference — it packs a DVD writer (not standard on all slimline laptops). The tradeoff is perhaps the 2.04kg weight — not the lightest in its class. Still, this is a reasonable-looking machine, with 1GB RAM, 120GB HDD, 2GHZ Santa Rosa Core 2 Duo and a 6-cell battery.

www.lge.com.au

BIG VAULT

Internal 1TB drives are becoming more common, including Seagate's Barracuda 7200.11, which uses perpendicular recording technology (fits more into a smaller space) and a 3GB/s SATA NCQ interface.

www.seagate.com



LIKES IT ROUGH

What actually makes a 'ruggedized' notebook tough? In the case of Pioneer's 15.4in S15, it's the magnesium alloy case, which is apparently '20 times' stronger than ABS plastic. That and the fact the system gets subjected to a range of drop tests. At $2,999, it's also not as expensive as you'd imagine for a specialised system with Intel's current-gen Santa Rosa platform.

www.pioneer.net.au

Oki B6500n

A workgroup printer that lives up to its speed claims.

CONTACT	OKI Printing Solutions
ONLINE	www.okiprintingsolutions.com.au
MARKET	SMB
PRICE	$1754.50 (w/duplexer $2172.50)

✔ Speed; good print quality.

VERDICT ★★★★½

✖ Can be noisy when operating.

The B6500n is a monochrome A4 printer for workgroups. It's capable of 1,200 x 1,200dpi and comes with 10/100M Ethernet, USB 2.0 and parallel interfaces as standard.

OKI quotes a printing speed of 43ppm, with the first page emerging in 8 seconds. Unusually, the B6500n lived up to that claim: we recorded 8 seconds click-to-drop for the first page, with the second page dropping into the tray consistent with the rated speed. Print quality was very good, with characters appearing smoothly formed even under a magnifying glass. There was no visible difference in text printing at 600dpi or 1,200dpi. An all-black page resulted in a smoother than average appearance and revealed non-printing margins of between 3 and 5mm on the various edges of A4 paper. Business graphics came out well, and the B6500n produced reasonable photo prints, although not a primary use for a laser printer.

The B6500n seems a solid choice for a workgroup. In common with many other laser printers it is fairly noisy when operating, but does turn out fast, quality prints. PCL and PostScript drivers are provided, along with Windows utility. Only a driver is provided for Mac OS X.

The front panel LCD and buttons provide a limited UI so the printer's web interface is much more convenient once the initial network configuration is complete. It allows interrogation of status information and control over IP address filtering, protocols (TCP/IP, EtherTalk and NetWare), and other settings and features.

Stephen Withers

HP Photosmart A626

HP's convenient lunchbox printer.

CONTACT	HP Australia
ONLINE	www.hp.com.au/
MARKET	Everyone
PRICE	$249

✔ Portable; flexible; well-designed.

VERDICT ★★★★☆

✖ Can lose detail in shadows.

The design alone tells you a lot about the HP Photosmart A626 photo printer — the 'lunchbox' with a carrying handle means the small printer can be easily carried around to wherever you have a photo printing project.

It can be directly connected to a computer via USB or used as a standalone printer. Photos can be directly printed from memory cards (Compact Flash, Memory Stick and Secure Digital/MultiMediaCard), direct from a PictBridge camera or from a USB stick, and the software provides the ability to use the printer as a card reader. A USB Bluetooth dongle can be attached for wireless printing from phones and other devices.

As a standalone, printing is easily executed through the use of a stylus on a screen that's reasonably large (4.8in) given the small size of the device. Navigation through menus is easy, and you are able to 'get creative' with your photos, quickly adding frames or captions, and even drawing onto the image with the stylus.

Print quality in comparison to an older 'lunchbox' model, the Lexmark P350 was favourable. Apart from a tendency to lose detail in shadows, we found the A626 to be a convenient and flexible photo printer that produces attractive images.

Stephen Withers

Dvico TViX M-4130SH

The war between HTPCs and PVRs continues to rage.

CONTACT Dvico TViX
ONLINE www.tvix.co.kr/Eng
MARKET Everyone
PRICE $645 (no HDD)

✔ Massive range of supported formats
VERDICT ★★★★☆
✖ Expensive

One requirement of any flexible home entertainment system is the ability to bring lots of different types of media together in one place. The TViX M-4130SH is a high-end example of such a product. Primarily designed as an High-Def TV Personal Video Recorder (HDTV PVR), it also functions as a feature-rich media player.

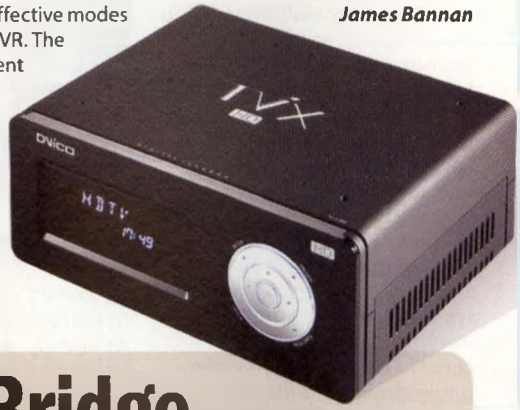
The unit is based on the Sigma EM8623 chipset with 16MB flash ROM. It's a SATA HDD-based system, accepting SATA-I and SATA-II drives and supports 10/100 Ethernet LAN with optional 802.11b/g WLAN. It's a true HD device, supporting both HD component outputs as well as HDMI up to 1,080p. It has digital coaxial/optical and analogue/stereo audio outputs, and the VFD display means that you can control the device without having to turn on the TV.

It's also USB 2.0-compliant — you can connect it to a PC for direct disk access, or plug in two USB storage devices and play back the contents. It's also flash-upgradable, and Dvico constantly release updates to improve performance and compatibility.

The unit has two effective modes — media player and PVR. The HDTV quality is excellent although the unit seems to require a very strong signal for smooth playback, and it doesn't like receiving a passthrough signal from another HDTV device.

Although it's quite expensive and doesn't come with a hard drive, the M-4130SH is far cheaper than an HTPC and much simpler to use. It makes an excellent base for any multimedia-capable entertainment system.

James Bannan



Pinnacle SoundBridge

This unit brings UPnP music to any corner of the house

CONTACT Pinnacle
ONLINE www.pinnaclesys.com
MARKET Everyone
PRICE $259

✔ Easy to set up, unobtrusive design
VERDICT ★★★☆☆
✖ LED is too small and limiting

Designed as a self-contained hardware media player, the HomeMusic is a relatively neat and simple-looking device with an integrated 802.11b/g WLAN adaptor. It has a standard 3.5mm audio output jack which can connect the unit to powered speakers or RCA inputs on a stereo.

It's powered by a 400MHz CPU and 16MB RAM, along with a Philips digital/analogue converter. It supports audio sample rates of 8-48kHz at 8- and 16-bits, stereo and mono. It handles WMA, AAC, MP3, WAV and AIFF formats, the Roku Control Protocol, UPnP AV and Windows DRM 10. Networking-wise it supports WEP, WPA, AudioIP, DHCP, TCP, Telnet and HTTP. There's also an SD flash slot which is useful for non-networked audio playback or local firmware upgrades.

The system is relatively easy to use, but the 16 x 2 line LED doesn't offer a lot of info. The menu isn't particularly deep, but with only two lines to work with it's difficult to figure out where you are.

The SoundBridge range of products are developed by Roku, but Pinnacle have the licence for the brand outside of the US. Therefore, most of the product support comes from Roku. Support is good, with updated manuals and firmware available, as well as a supported online community forum.

With the limited LED and basic setup, the HomeMusic can be tricky to connect to a secured home network — we needed a firmware update before it would work on our WPA-PSK WLAN. Internet radio streaming was accessible straight away, as was the media collection served by TwonkyVision. However, the limited LED made browsing a large music collection rather time-consuming and tedious, although playback was perfectly adequate.

James Bannan

THE MINI-WEB

It's not 3G, and it doesn't have a phone, but as we reported on apcmag.com, the PocketSurfer2 is raising eyebrows with its approach to mobile web access. The handheld with a 5.2in screen uses compression to speed up web browsing over the GPRS mobile network. The drawcard? In some countries, PocketSurfer2 users don't pay data charges. No word on pricing or availability at time of writing.

www.pocketsurfer.co.uk/

TOUGH PDAS

Pull one of these out at a meeting to check your appointments, and no-one will ever call you a wimp again. The GoBook MR-1 is the world's first "tough" UMPC. Weighing just 0.9kg and small enough to fit in your pocket it's a fully functional Windows Vista PC that sells for only $7,150. ***www.avantec.com.au/itronix.html***

SECRET SCANNER

Canon's ScanFront220 network scanner keeps your scans private – it's able to preview captured images on its 8.5in touch panel and scan them to email, a network folder, FTP site and even a USB memory stick. The Professional Edition model has a fingerprint authentication sensor as well. Price to come ***www.canon.com.au***

SORRY DAVE

When we hear a 'danger alert' dialog box, we wince. Here's hoping Trend Micro has made its new LeakProof 3.0 data leak prevention software user-friendly as well as security-tight. The upside is that LeakProof may make life easier for security administrators, who must walk the fine line between keeping sensitive data under wraps and not annoying the heck out of their users. The system will control the way users deal with sensitive files (encryption can be enforced) and explain safer data handling.

www.provilla-inc.com

IPHONE NEWS

It's not here in Australia yet (well, not officially, at the time of writing), but when the iPhone does arrive it'll do more than let you view photos, play music, and fiddle with calendars and surf the web (oh, and make calls). In February, third-party software developers should be playing with the iPhone software toolkit, meaning 'official' iPhone apps that hopefully won't be buggy.

www.apple.com.au

DELUXE GPS

We're not fussed on MP3 playback when it comes to GPS, but we are intrigued by the 2MP camera in Mio's c720t GPS device. The 4.3in screen runs Windows CE 5.0 and has multi-language text-to-speech. Word is the c720t is also equipped with a TMC radio module, which will come in handy when traffic updates finally arrive.

www.mio-tech.com.au

System Commander 9

Installing several OSs at the same time has never been easier.

Repartitioning your drive used to be something of a dark art because, despite the warnings, none of us would back up our data before diving headlong into the process. And with the somewhat crude tools for managing the process, a mistake could be catastrophic. Sudden power loss, accidentally hitting the reset switch or any other interruption during repartitioning would cause irreversible damage to your disk's partition table, leaving you with nothing but a commitment to make a backup next time.

The consequences are still there but modern partitioning software has made the process easier. And if things do go wrong there's a good chance you'll recover your data.

Stored data spans an entire partition. Even if you're only using 50 per cent of the space, that data is typically spread across the entire drive. Repartitioning software combines defragmentation with the modern equivalent to 'fdisk' creating new partitions from that portion of freed space. Partition managers also need to address another problem — allowing those new partitions to be used by an OS that expects to be the king of disk drive governance. For example, Windows XP needs to be coaxed into booting when there's another OS on the drive. Windows Vista can accommodate an old XP installation but it's not so clever if you're having nostalgic feelings for Microsoft's previous release, and neither XP nor Vista behaves well if you want to install Linux.

System Commander 9 gets around this by installing its own governor onto the master boot record, intercepting any attempts to hijack this sector back to its original state. By comparison, Linux boot managers write themselves to the boot record too, but lack any ability to ensure Windows doesn't reassert its own boot record onto the disk.

If there was a competition for which of these boot managers look the best, the winner would be System Commander and its Vista-style Window — quite a feat when your PC has yet to boot an OS.

apc Highly Recommended

System Commander 9: The only control you have over this program's installation is whether it's enabled or disabled.

CONTACT	Avanquest
ONLINE	www.avanquest.com
MARKET	Everyone
PRICE	US$69.95

✔ Good functionality; easy to use.

VERDICT ★★★★☆

✖ Sluggish interface.

Nice graphics mean disk partitioning has become a process almost anyone can use. There are dozens of advanced options hidden within System Commander, but these don't get in the way of letting ordinary users squeeze enough room onto their Vista partition for XP, Linux, Solaris and other OSs.

The partitioning process, once the domain of memory-resident DOS programs, can now be safely run at boot time before Windows even thinks about opening a swap file. It's easy to do, too. System Commander 9 features a great partition wizard that steps you through four common tasks — freeing up drive space, disk defragmentation, adding another OS and copying a partition — and you don't need to know anything about the process. This is a good thing for those feeling nostalgic about XP. Dual, triple or even quad booting is easily attainable with this, and while it's possible to accomplish the same task for free using an open source tool, that's still classified as a dark art in our book — which is exactly what OS management with System Commander 9 isn't.

System Commander 9 should be considered an OS, albeit one with a small, self-contained feature set. It runs off the master boot record of your hard disk when you boot your machine. This reflects earlier versions that were primarily boot managers, not repartitioning tools. This early stage of the boot process lends itself to disk tinkering because System Commander ensures no other part of the disk is being used. This combination makes System Commander the perfect tool for managing multiple OSs — a process that needs to combine a boot manager with the ability to resize and repartition your hard drive. The only downside is that pre-operating system means pre-drivers, and while the video resolution is high enough, the screen refresh rates are restricted to the ancient VESA compatibility mode. However, we'd rather see a sluggish graphical interface than none at all. Multiple versions of Vista and XP are well catered for, as is Linux. If you want to install several OSs for the first time, this is a great choice.

Graham Morrison

Apple Final Cut Express 4

Edit like a pro for the cost of a consumer.

CONTACT	Apple
ONLINE	www.apple.com.au
MARKET	Prosumer
PRICE	$268

✔ Flexible; professional tool.

VERDICT ★★★☆☆

✖ No iLife integration.

Apple has filled the breach between iDVD and Final Cut Pro (FCP) with Final Cut Express 4, or FCE 4. Many customers were disappointed in the newest version of iDVD as many of the features, such as the editing timeline and third-party plug-ins were abandoned in favour of a simpler interface and YouTube integration. In FCE 4 there's a more powerful and complex tool. FCE 4 is pitched as an application for those who want to try out professional-level software but are unwilling to make the leap to the $1,300 Final Cut Studio until they know what they're getting.

FCE 4 is designed for editors working on a single system. In contrast, FCP is made for larger, multi-person teams and can use systems on the network as part of a computing grid, so processing resources are shared.

Editing in FCE 4 is non-destructive, meaning you can always go back to a previous state with your footage. Also, as a non-linear editing tool, it means you don't have to shoot footage in the order you'll use it.

The list of different transitions and effects is very impressive — there are hundreds to choose from. Sound can also be edited and there are plenty of options there, as well as titling effects in Apple LiveType which make jazzing up text easy.

We tested FCE 4 on a Mac Mini running Leopard 10.5.1 with a Core Solo 1.5GHz processor and 2GB of memory. We were pleasantly surprised at the speed with which transitions and special effects rendered but we figure that Apple's minimum requirements of a PowerPC G4 are impractical. If you're planning to work on large projects, a MacBook Pro or Mac Pro with plenty of processing grunt — at least 2GB of memory and as much disk as you can afford — is a reasonable configuration. It's worth noting that some effects process faster than others depending on the complexity of the task.

We were able to move up from iDVD as projects can be exported as Final Cut XML, which FCE 4 can open and use. As Apple has embraced XML as part of its file format, all the transitions and effects you apply can be easily moved between parts of Apple's multimedia suite.

FCE 4's interface will feel comfortable to experienced editors. There's a timeline on the bottom pane that defaults to a pair of video and four audio channels. Capturing footage from a camera was simply a matter of connecting the camera via FireWire, starting FCE 4 and hitting the capture button.

Once the footage was captured we could start the editing process. One of the most substantial improvements from previous versions of FCE is the number of new video formats supported. It's possible to use DV, HDV and AVCHD footage in the same project, making it easy to work on collaboratively even if all the team members aren't recording in the same format.

One thing switchers from iMovie will miss is the integration with the iLife apps, especially iPhoto and iTunes. It's possible to bring media in from those apps but the familiar Media Browser will have to make way for FCE 4's import tool. It works but just isn't as friendly as you'd expect from an Apple program.

Given the complexity of FCE 4, user documentation is important. The software ships in a box only slightly larger than a couple of CD cases, like all of Apple's consumer software. However, the help menu provides access to a full user manual that's over 1,100-pages long.

All in all, FCE 4 is a very powerful piece of software. If you find iMovie doesn't provide the sufficient flexibility for your video projects, FCE 4 delivers pro-level software at consumer pricing.

Anthony Caruana

SIGN ME UP

Giving your small business a high-tech look via some fancy onscreen displays should now be less fiddly, thanks to a little box Anyware calls the Digital Signage Media Player. It allows you to bypass a PC and plug your multimedia presentation straight into a TV or monitor (you'll need a memory card). Price: $158.

www.anyware.com.au

MAL, WE HAVE WARES

It's the eternal security question - how much security is enough? Marshal is taking the 'better safe than sorry' approach by integrating Sophos antivirus and anti-malware into its email and web gateways. The gateways protect business networks against spam, viruses and also help enforce security policies.

www.marshal.com

iDOESN'TEXISTYET

It's potentially the next hottest thing in notebooks after the Asus eee PC, but Apple is still mum on whether it will launch a pint-sized notebook. Now Apple fans are providing some prodding, coming up with their own homemade designs - search for 'apple tablet contest' on ***gizmodo.com.***

Windows Server 2008 walkthrough

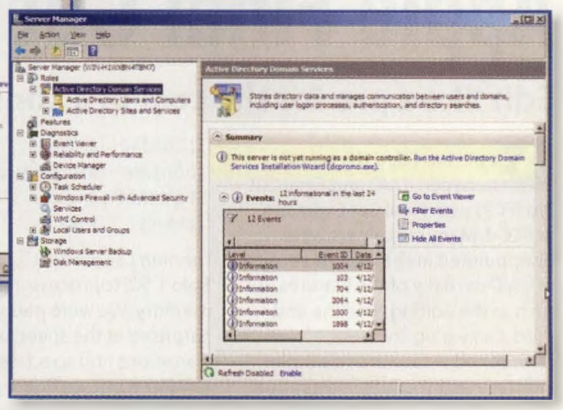
Windows Server 2008 is finally about to be released. *Paul Schnackenburg* explains what you can expect when you first install it and provides a hands-on tour of its features and enhancements.

The time when a server was a simple file-sharing mechanism is long gone; so is the time when a simple web server sufficed. Windows Server 2008 is a server OS that can carry out all those roles and more, and it's easier than ever to install, configure and maintain.

Starting from the beginning, installing Windows Server 2008 is easy: just select language and which disk to install to, along with product key. Once the installation is complete, Initial Configuration Tasks (ICT) takes over and you can define network, Remote Desktop, Windows Firewall and Windows Update settings.

Initial Configuration Tasks
Perform the following tasks to initially configure this server
Windows Server 2008
Provide Computer Information
Update This Server
Customize This Server

Initial Configuration Tasks: help your server take its first steps.



Server Manager: see exactly what roles this particular server is performing and maintain them, all in one place.

Server Manager takes over after ICT, and this is your one-stop shop for all configuration and maintenance in Windows Server 2008. Modularisation is a recurring theme in Windows Server 2008 and so you add only the roles that this particular server needs to perform.

There are 18 roles to choose from, and once installed, each role is allocated its own area in Server Manager, as well as links to both local and online help. Server Manager feels very intuitive to use, covering everything necessary with little need to head for the individual MMCs (Microsoft Management Console) in Administrative Tools.

We like the diagnostic facilities in Server Manager, presenting data in a similar way to Task Manager, but with more details. You can even see the individual components that make up svchost.exe — that's not easy to do in Windows 2003.

RUN PROGRAMS EVERYWHERE

Numerous enhancements to Terminal Services make it a serious competitor to Citrix, at least in a Windows-only environment. One of the most beneficial new features for administrators is Remote Programs. This is essentially a terminal services session per program that looks like a normal, installed application. Notification area icons, Start menu shortcuts — everything works just like a locally installed application. When coupled with redirection of local drives and printers, it's hard to notice anything different from other programs. The beauty for administrators is, of course, that there's *one* copy of the program to maintain and patch on a tightly controlled server, not on hundreds of desktops.

Starting several programs hosted on the same terminal server still only takes up one session, rather than the resources of several sessions. To take advantage of Remote Programs, you need RDP client version 6, which limits you to Windows XP SP2 and Vista. Terminal services now supports Single Sign On (SSO) so that the credentials of the currently logged-on user are used, contributing to a seamless user experience. TS Gateway is also new, presenting an SSL-protected web site that acts as a portal for remote users accessing any terminal servers on the internal network. RDP traffic can be tunnelled over HTTPS, eliminating the need for a VPN connection to be made first. Terminal services exposed through TS Gateway can run on Windows Server 2008, Vista, XP or Windows Server 2003.

TS Web Access combines with Remote Programs and makes it possible for remote users to visit a web page, select a program and have it run as a local application. Other fresh additions to terminal services are support for large monitor resolutions, and desktop spanning over several monitors. A new Easy Print system should make printing from within a TS session to a local printer a seamless experience.

A FASTER NETWORK?

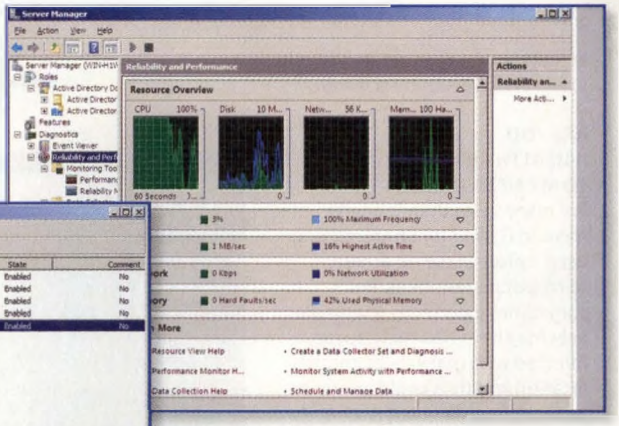
The whole TCP/IP networking stack has been totally rewritten for Vista and Windows Server 2008.

Features such as Receive Window Auto-Tuning and Compound TCP both help achieve significantly higher throughput in both WAN and LAN scenarios. There are also several new standards incorporated specifically to enhance wireless networking, including:

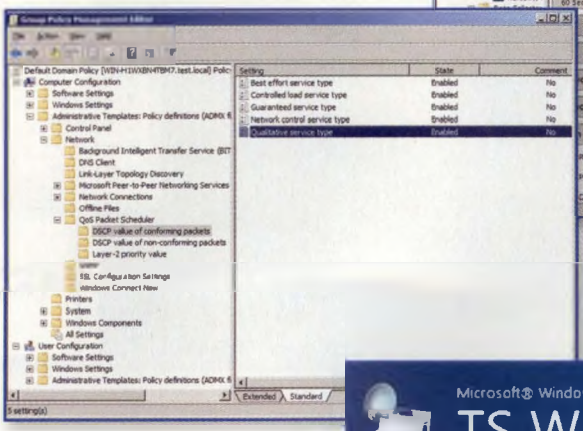
- IP version 6 is built into the new stack and can be configured in the GUI just like IPv4.
- With Policy-based Quality of Service (QoS), particular network traffic can be given higher or lower priority using Differentiated Service Code Point (DSCP) values, and unlike earlier attempts at QoS, this requires no participation by the

applications themselves.

- IPSec configuration is now fully integrated and the new firewall (first seen in Vista) supports both outgoing and incoming filtering. When building rules for the firewall, both user and group accounts can be used, providing fine-grained control.
- Vista and Server 2008 use the new Server Message Block 2.0 standard when communicating with each other. It adds improvements such as larger buffer sizes, vastly increased numbers of open files on a server, and resiliency over unreliable links.



Performance Overview: taking the heartbeat on your server's CPU, memory, disk and network systems.



QoS: my traffic is more important than yours.

Microsoft® Windows Server® Code Name "Longhorn"
TS Web Access
Remote App Programs
Paint
WordPad
LHB3
I am using a private computer that complies with my organization's security policy. (More information...)

TS Web Access: run a program anywhere where you have an internet-connected PC.

SERVER CORE

Server core is Windows without a Windows GUI. Offering only a command prompt for initial configuration, and with only the needed bits for each role actually on the hard drive, it takes up less disk space and offers less of a target for hackers. Server Core is not an application platform, but rather a performance-optimised server installation option for specific server loads. The roles that can run on Server Core are: Windows Server virtualisation, DHCP, DNS, WINS, file server, Active Directory, Windows Media Services and Print Management.

BRANCHING OUT

There are a host of new features in Windows Server 2008 specifically for branch office scenarios. Read Only Domain Controller (RODC) helps reduce the risk to the enterprise in the case of a branch office DC being compromised. Administrators have total control over which passwords are stored on the server: none, or a select few. Enhancements to the security model also allow a user to be a local administrator without having access to Active Directory. Hand in hand with RODC, there's a Read Only DNS server feature, once again reducing the risk to the rest of the enterprise if a local DC is attacked.

RODC can also be coupled with Server Core for an even more minimal attack surface. Bitlocker (whole hard drive encryption), first seen in Vista where it works to protect data on lost laptops, also works really well for servers where physical security is weak.

ACTIVE DIRECTORY

There's a whole new class of auditing offered for changes to objects in Active Directory. In earlier versions, only the fact that something was changed was logged. In Windows Server 2008, the before and after actual values can also be logged, providing in-depth tracking of all changes. Active Directory (AD) is also exposed as a service on a Domain Controller so that it can be stopped and started without having to restart the entire server. This comes in handy for offline defragmentation of the AD database or when AD is not behaving properly.

Recovering accidentally deleted objects in AD is easier due to the new Snapshot Viewer technology and a new extension to NTDSUtil that lets you create point-in-time snapshots of AD. Snapshots can be mounted without having to restart the server in Directory Services Restore Mode, and can then be opened in AD Users and Computers to compare them and choose the best one to restore.

As in many other Microsoft server applications released over the last year, Windows Server now has PowerShell integrated.

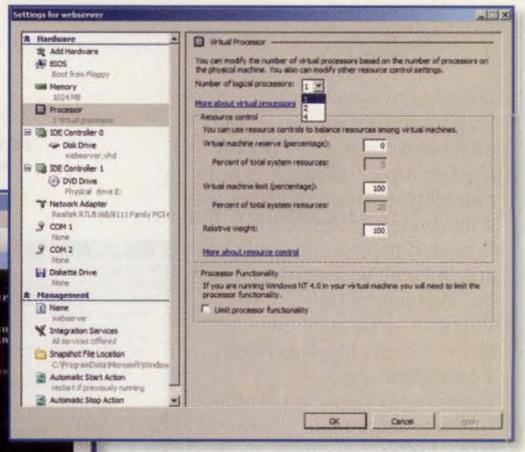
ALL EGGS IN ONE BASKET?

The ability to cluster several servers together has been available in Windows Server ever since Windows NT days, but it has been a complex technology requiring special skills. The renamed Failover Clustering is a lot easier to set up and use. There's a new validation wizard that checks all nodes, the network and the shared storage to ensure a successful experience. Another big improvement is the way a cluster deals with loss of inter–node communication. In previous versions of Windows Server, the quorum disk was a single point of failure, but due to Windows Server 2008 using a hybrid of the majority node set model and the quorum disk model, even a two-node cluster with a failed quorum disk will continue to work. The biggest change for large networks, however, is the ability for nodes to be located on separate subnets. In Windows Server 2003, all nodes had to be in the same subnet, making it nearly impossible

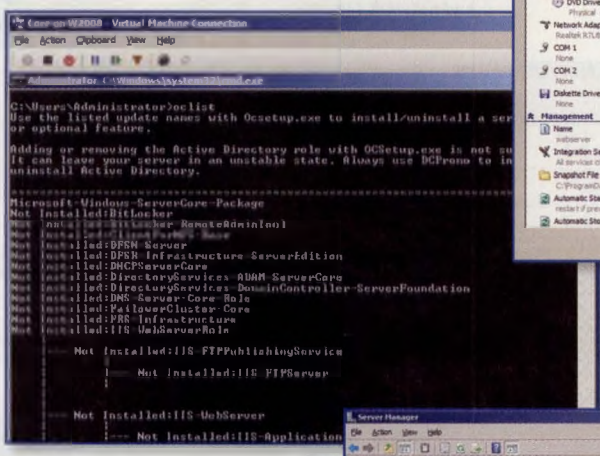
INSIDE INFO

- Windows Server 2008 home **www.microsoft.com/windowsserver2008**
- Windows Server 2008 TechCenter **technet.microsoft.com/en-au/windowsserver/2008**
- Windows Server 2008 Network Access Protection, NAP ***APC* November 2006, page 54**
- Windows Server 2008 Windows Deployment Services, WDS ***APC* December 2006, page 60**
- Windows Server 2008 Terminal Services, TS ***APC* July 2007, page 48**

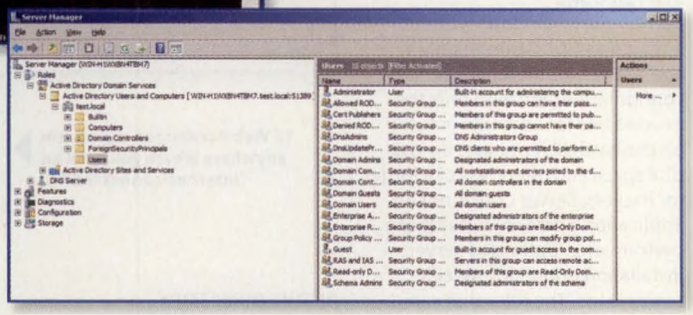
to link two data centres in different locations for disaster recovery.



Make sure your virtual machines have the grunt they need.



Server Core: command-line-only version of Windows — Linux buffs rejoice!



Snapshot Viewer: this is a snapshot viewed in AD Users and Computers (note the LDAP port).

ARE YOU A HEALTH RISK TO MY NETWORK?

For many years there's been a focus in IT security on identifying users before allowing access to corporate resources. But sometimes a perfectly legitimate user may have had their laptop infected with malware at another location and thus could infect the network from the inside.

We need a way to check that the computer is healthy, as well as a way to identify the user. In Windows Server 2008 that feature is Network Access Protection (NAP), which can check that a personal firewall is installed and turned on, that antivirus and anti-spam is working and up to date. If the client computer is deemed not healthy, it can be directed to a separate subnet where a remediation server can offer patches or signature updates to bring the PC back in line.

Enforcement of NAP can be done through DHCP, IPSec, 802.11x and for VPN clients. The settings to check for will also be extended by third party vendors. Cisco has a similar network-based technology called Network Access Control (NAC); fortunately, these technologies will interoperate.

It's important to realise that NAP doesn't protect your network against malicious attacks. A laptop that meets all defined policies, and is therefore given free reign on the network, can still be used to launch attacks. The point of NAP is to protect the integrity and resiliency of the network by ensuring that clients (and servers) are up to a set standard.

AUTOMATIC DEPLOYMENT

Remote Installation Services (RIS) in Windows 2003 has been replaced by Windows Deployment Services (WDS) in Windows 2008. WDS is also a part of SP2 for Windows Server 2003 and uses the new Windows Imaging Format (WIM) to automatically deploy an OS and applications to new PCs. For client computers that support Preboot Executable Environment (PXE) boot, the installation is very similar to an installation from DVD.

WINDOWS SERVER VIRTUALISATION

Windows Server 2008 will include a virtualisation platform, Windows Server virtualisation (WSv), also known as Hyper-V. Or rather, six months after Windows Server 2008 has been released, the final version will be ready. There's a preview of the technology offered in Release Candidate 0, and a beta is available now. The Hyper-V needs a 64-bit version of Windows Server 2008. The CPU also needs to have hardware-assisted virtualisation extensions, called Intel-VT by Intel and AMD-V by AMD, as well as having Data Execution Prevention (DEP) enabled.

Each virtual machine can be assigned a maximum of 32GB of memory and up to 8 processor cores (subject to the amount of physical RAM and CPUs on the host server, of course). Guest OSs includes both 32- and 64-bit versions of Windows and Linux, as well as older OSs.

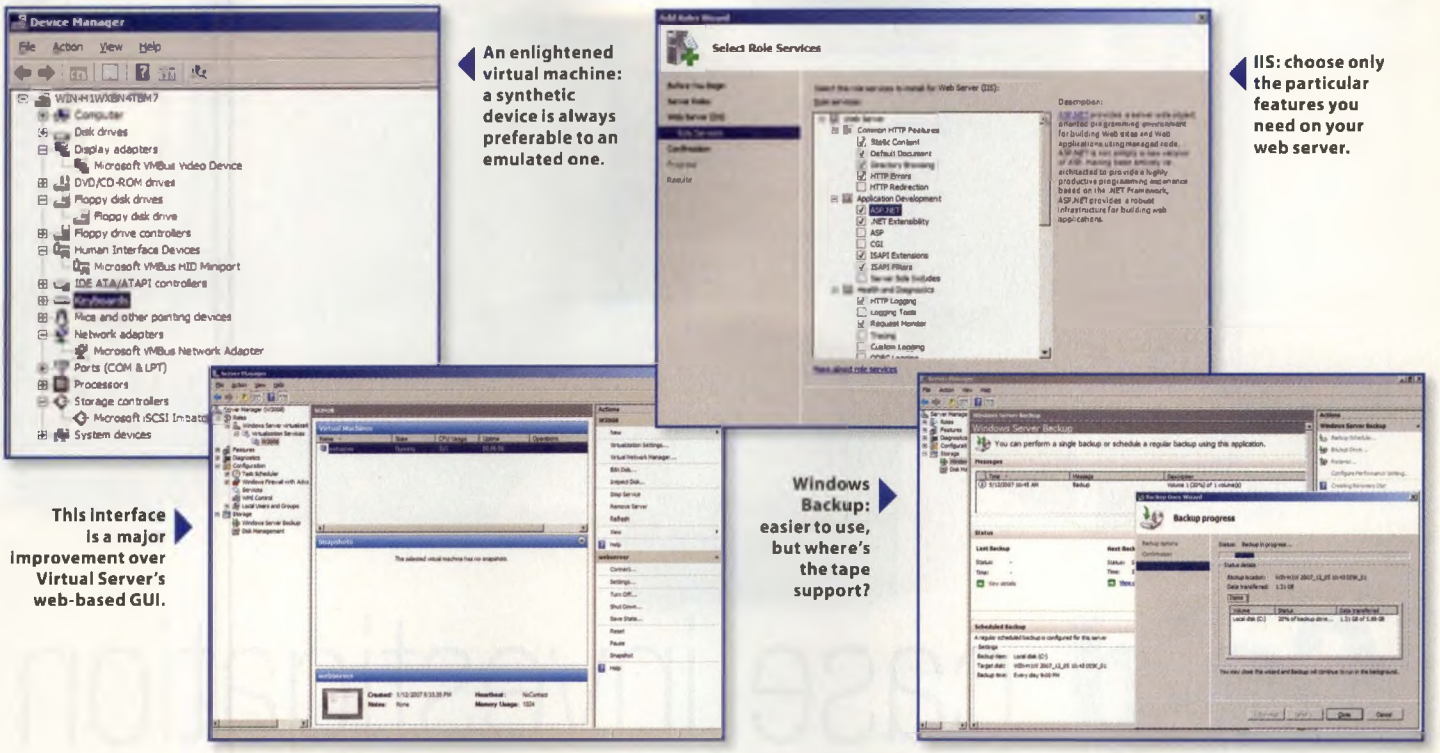
There's a lot to like about Windows Server virtualisation (WSv). Whilst there's no direct upgrade path from a Windows Server 2003 running Virtual Server 2005 to Windows Server 2008 with WSv, the virtual machines themselves can simply be transferred to a WSv server.

Memory usage is minimised in WSv because of Memory Page Sharing, where pages of memory that are identical in several virtual machines are only stored once. For example, if you have two Windows Server 2003 virtual machines running simultaneously, it's likely that a lot of the OS code in memory is identical and thus will only be stored once. WSv brings the concept of 'enlightened' virtual machines — the OS running in a VM is aware that it's being virtualised, something that should help performance.

There's also another performance enhancement coming in WSv: Synthetic Devices. Traditional virtualisation presents emulated devices to the guest OS, such as a virtual Adaptec 2940 SCSI controller for hard drives. This means performance is limited by the constraints of the device, whereas synthetic devices have no emulated limitations. Windows Server 2003 and 2008 can be 'enlightened' to take advantage of synthetic devices, as can Xen-enabled Linux distributions, due to Microsoft's deal with Xen Source.

Another feature that should prove popular is pass-through disk access, where a virtual machine, traditionally limited to seeing its own virtual HDD file, can connect to outside file systems. So a database can be stored on an SAN and a virtual machine can run it, but reports can be generated on another system that also has access to the database.

One thing that will ensure that WSv is taken seriously in enterprises is the support for clustered WSv hosts. Using standard Windows Server 2008 failover clustering and a SAN (shared storage), virtual machines can be Quick Migrated from host to host as maintenance schedules require, or in case of a disaster. It's not as funky as VMWare's VMotion, where these movements can be done whilst the system is still servicing clients, but the downtime should only be a few minutes. This opens up new opportunities where an HR database that's hardly ever used


An enlightened virtual machine: a synthetic device is always preferable to an emulated one.
IIS: choose only the particular features you need on your web server.
This interface is a major improvement over Virtual Server's web-based GUI.
Windows Backup: easier to use, but where's the tape support?

for 14 days is hosted on a heavily loaded host and then migrated to a less loaded host for the day or two when the payroll is generated. WSv also supports clustering between guest VMs.

Licensing for virtual machines stays the same as in Windows Server 2003 R2: Enterprise allows up to four Windows Server guest OSs and Datacenter an unlimited number of OSs with no additional licensing cost.

Hyper-V is a serious contender in the virtualisation space and whilst it lacks some high-end features offered by the competition, it's a big step up from Virtual Server 2005, Microsoft's current offering.

TOO MUCH CHOICE?

There are several versions of Windows Server 2008. It starts out relatively easily, with versions following the pattern in Windows Server 2003. There's Standard, Enterprise, Datacenter and Web, along with a version for Itanium (Intel's 64-bit not x86 compatible CPU, for high-end servers).

Then there are 32- and 64-bit versions of each of these. And then there are versions without Hyper-V and versions with (only on 64-bit versions, mind you), and they will be sold as different products even though the price difference is only US$28. Finally, there's a version of Hyper-V without Windows that only costs US$28. A total of 13 versions!

Why not just bundle Hyper-V with every version of Windows Server? The only reason we can see for this move is that the European Union might get a bit shirty about the bundling of Hyper-V. It's similar to how Windows XP and Vista are available in two versions in Europe, one with the appendix 'N' that doesn't have Windows Media Player built in, and the normal version that does.

The Datacenter version offers features such as adding and replacing memory, as well as processors while the system is running, whereas Enterprise only gives the ability to add memory. Both Enterprise and Datacenter can be clustered with up to 16 nodes in each cluster.

Windows 2008, it has been promised, will be the last version of Windows Server to come in a 32-bit flavour. The updated version, 'R2', due a couple of years after the initial release, will be 64-bit only. This shouldn't be a major headache then, as you'll be hard pressed to buy a server today that isn't equipped with 64-bit CPUs.

WEB SERVER IN BITE-SIZED PIECES

New in IIS 7.0 is delegated administration, and the same modularisation that permeates Windows Server 2008 continues here. There are 40 separate feature modules and you can choose only the ones you need. This leads to better performance, stability and security. Configuration of each web site is stored in XML files and you can have individual IIS configurations per application running on IIS. This will be great for developers and administrators; they can easily copy settings from server to server.

BACK ME UP

The totally new backup tool uses Volume Shadow Copy Services (VSS) to seamlessly back up volumes, including open files. DVD media can be the target of manual backups but scheduled ones have to be stored on disk. There's no longer support for tape media.

Windows Server 2008 brings a plethora of new and enhanced features to the table, many of which come directly from administrators' wish lists. For businesses still relying on a Windows 2000 infrastructure, the upgrade should be an easy sell. In a Windows 2003 shop, it could be a bit harder to justify the step. But as Windows Server 2008 can happily coexist with its earlier brethren, don't be surprised if it soon appears on a server near you.

HOW WE TESTED

32-bit OS	x86 Web	x86 Standard	x86 Enterprise	x86 Datacenter
Physical CPU	4	4	8	32
RAM max. GB	4	4	64	64

64-bit OS	x64 Web	x64 Standard	x64 Enterprise	x64 Datacenter
Physical CPU	4	4	8	64
RAM max. GB	32	32	2,048	2,048

Cold case investigation

***Nick Race* opens up the latest premium PC cases.**

Building a new top-of-the-line PC is a rite of passage for every geek. Whether it's a multimedia machine for video editing or audio production, the ultimate gaming rig or a super-powered system for your coding pleasure, there's something immensely satisfying about putting your own system together piece by piece. After all, you're going to spend a lot of time using it.

Choosing the components is one of the great joys, considering each part, the pros and cons then finding them to buy and at the right price. Where many folk fall down is with the chassis. I know a large number of people who, after spending $2,000 on components, jam it all in a $30 case. Gashed fingers, poor airflow and never enough expansion space is the penalty for that faux pas.

In argument, some people shy away from premium cases, purely on the fact they feel they're too gaudy. For every nicely constructed aluminium case with good drive bays, there's ten flimsy steel cases, with half their weight in LEDs.

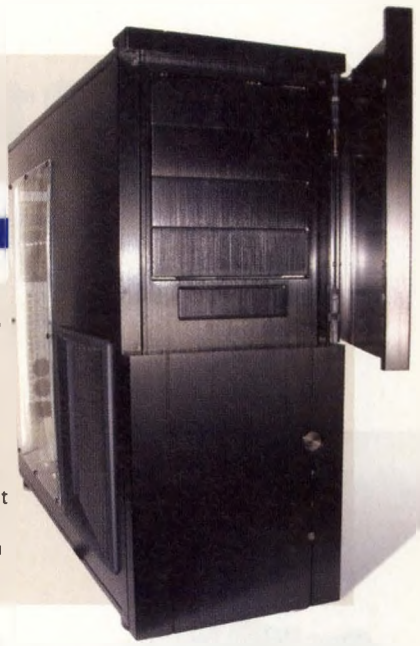
So what does a premium case include? We took a step back here at *APC* and decided on a few criteria. First: as little bling as possible. These cases are workers, not show ponys. We avoided anything that has a primary purpose of acting like a Christmas display. Second: effective cooling and airflow. The faster your kit, the hotter the system. Sustaining a proper air flow through your chassis is the easiest way of keeping temperatures down. Also usual for high-end chassis are items like toolless entry, or toolless all the way through, lock-in drive bays, nicely routed cables, full cable management systems and big windows. Last of all, we looked for solid construction and decent components. Something that will last through a few generations of hardware.

ENTHUSIAST SYSTEM ARCHITECTURE

The Cooler Master COSMOS and a version of the SilverStone Temjin TJ10 are the first chassis to hit the market as part of a new breed of smart, connected chassis supporting ESA (or the Enthusiast System Architecture), a system of connecting previously 'dumb' devices for control and monitoring. These include the chassis for heat monitoring, PSUs for heat and power, and water-cooling systems for flow and noise. It's designed to link in with system monitoring software, to give a better overall insight in and control of a PC. Demonstrated recently to us by Nvidia, ESA is a standard available to some PC parts manufacturers to allow those into overclocking (or just cool and quiet systems) to dig deeply into just what, exactly, is going on inside their cases.

ESA components are linked using a USB bus, and its completely software-controlled and dependent. This functionality means a relatively small increase in cost. If you're considering ESA, then pay attention to the parts you're purchasing, as not everything is supported.

SilverStone Temjin TJ10



SilverStone are best known around the *APC* Labs for their excellent HTPC enclosures, and the TJ10 is one of the first full-size cases we've seen from the Taiwan-based company. The TJ10 is a pretty hefty case, made in a similar style to Lian Li chassis — plentiful use of brushed aluminium, clean lines and a very high standard of construction.

The TJ10 would suit seriously cashed-up gamers or video editors — there's loads of room to build a seriously powerful workstation in this beauty. The case supports Extended ATX for large motherboards, plus it's designed with clearance for even the longest graphics cards (we're looking at you, 2900XTX). The good news is that even though it gives a cool and clean experience, there's plenty of cooling nous going on inside for motherboards and graphics cards. It doesn't appear as though the hard disk drives have any active cooling, though there is space around them for some air flow. So keep that in mind if you're building something with very hot drives (eg. SAS).

The door of the chassis is aluminium and firmly attached, while USB, FireWire and audio front outputs are on the top of the case. If it's under a desk, they might be a bit of a reach.

CONTACT Altech
ONLINE www.altech.com.au
MARKET Everyone
PRICE $440

✔ Oustanding construction.
VERDICT ★★★½☆
✖ Hard drives without cooling.

Tagan APLUS El Diablo

This is the first Tagan chassis to come through the doors of the *APC* Labs, and frankly, we wouldn't care if it's the last. The APLUS El Diablo is a monstrously sized mid-tower ATX case with what Tagan claims to be the world's largest case fan. The side panel is mostly taken up with a 360mm fan. Yep, 36cm. It's bigger than the exhaust fan in our laundries.

Once we got over that hump, the El Diablo is a seriously ugly case. The vaguely grey highlight down the middle of the front door doesn't do anything for its looks. The door itself seems fragile, and we'd be scared of breaking it. In fact, a small amount of downward pressure made the front of the case pop off. That's not what we like to see.

We were unimpressed with the cable management of the unit, needing to stretch a few power cables around the very large case to get all the fans powered.

The case can hold an impressive seven 3.5in HDDs, plus five 5.25in drives. Larger EATX motherboards are supported as well. We don't feel the quality of this case is even close to what we're used to seeing from Tagan.

CONTACT Actiontec
ONLINE www.actiontec.com.au
MARKET Everyone
PRICE $180

✔ No problems keeping cool.
VERDICT ★★☆☆☆
✖ Fragile door/front; sub-par quality.

Enermax Chakra

This is a strange contribution from Enermax. The Chakra is very much a gaming case, including a wide-open meshed side panel with a huge 25cm 'monster' LED lit fan. Bizarrely, the fan can be controlled from the side of the case also, including an on/off switch (handy) and a fan direction reverse switch, which isn't something we've seen on a fan of any size to date.

Beyond the inexplicable blue bling, the Enermax Chakra is a decently built steel case. Though it's not near the standards of the ultra-premium case market (SilverStone, Lian Li and Zalman), it's far from the worse steel case we've seen.

The edges are rounded, and there's little opportunity for doing unscheduled reconstruction of the skin on your hands. The Chakra can squeeze in five 3.5in drives and five 5.25in drives, and also includes an eSATA port on the top front of the case. The 3.5in drive bays are removable and toolless, and all 5.25in drive bays have front access.

The case's 12cm front-mounted fan includes a dust filter, but considering a huge percentage of the side of the case is constructed from mesh, we wonder if it's of any value. The air flow on this case can't help but be good, and the 25cm fan is suitably quiet. There's nothing specifically bad about the Chakra case, but it doesn't leave a great impression overall.

CONTACT Actiontec
ONLINE www.actiontec.com.au
MARKET Everyone
PRICE $190

✔ Room enough to move around.
VERDICT ★★★☆☆
✖ Questionable 'features'; design.

Antec P190

The P190 from Antec is another of the monster cases on show. Measuring in at 515 x 205 x 593mm, finding a spot to put it might be a challenge.

A major difference with this case is that Antec has included two of its PSUs to provide 1,200 watts of power for a major rig. Antec's approach to the very high end of the PSU market is evident here — instead of shooting for a single PSU with a huge rating, they've separated it into a 650W for motherboard and cards plus a 550W for drives and added extras, for what they claim is a superior result.

It's a pleasure to build a system in the P190 (ignoring the lack of removable motherboard tray), but there are concerns about the case in general. Firstly, it's by far the heaviest tank of a thing we've seen. Moving this one once you've loaded it with hardware goes beyond the pale. Our other grudge comes from the P190's front panel door. The door and hinges seem nice and solid, but it's attached to a piece of reasonably flimsy plastic that doesn't fill us with confidence.

Air flow for the P190 is quite impressive, with top-mounted fans and a separate air path for the PSUs. You could build a great machine in this, but don't expect to move it once it's built.

CONTACT	Altech
ONLINE	www.altech.com.au
MARKET	Everyone
PRICE	$660

✔ Heaps of room; good air flow.

VERDICT ★★★★☆

✖ Huge and heavy.

Antec Nine Hundred

This is the gamer's chassis from Antec, and it includes some nifty ideas. One of the smaller cases on review, the Nine Hundred also includes one of the bigger fans, but not in the usual spot. Antec includes a 200mm fan in the top of the case to exhaust naturally rising heat. There's also a 120mm fan mounted mid case, behind the drives but in front of the motherboard, combined with two 120mm fans in the front of the case — you've got some serious air flow.

Building a system in it is a squeeze, especially if you install the mid case fan, and beware of full-length video cards (like the 8800GTX and Ultras) — you'll shoehorn them in, but it won't be pretty.

Design-wise, Antec has taken cues from Thermaltake's Armor series and Cooler Master's Stacker cases, including a mesh front, but protected by material at the sides of the case.

Unfortunately, the Nine Hundred looks a lot cheaper than it is, using copious amounts of thick plastic in place of more-expensive but better-looking steel or aluminium. It'll either appeal or otherwise turn you right off.

The Nine Hundred would be suitable for a gamer's rig, but we wouldn't qualify it as a truly impressive case.

CONTACT	Altech
ONLINE	www.altech.com.au
MARKET	Everyone
PRICE	$220

✔ Loads of fans; good cooling.

VERDICT ★★★☆☆

✖ Tight fit; looks cheaper than it is.

Zalman Z-Machine GT1000

This chassis was a very pleasant surprise. The GT1000 'Z Machine' from Zalman is a mid-tower chassis designed for quiet and cool gaming, though there's nothing to it that limits its use for anything else. The Z Machine is very solidly contructed from 5mm aluminium. Double doors on both sides of the machine give access to the roomy interior, while also allowing for the motherboard to be swung out and worked on without resorting to flashlights and cramped spaces.

The air flow for the GT1000 is reasonable, but not the best we've seen. Twin 90mm fans at the front of the case pull air in over the hard disk drives, then across the CPU cooler and out via a 120mm fan under the PSU. It's not a bad design, but considering the air-tight construction of this case, and running pre-warmed air over the CPU cooler, it could be better.

The chassis holds six 3.5in hard disk drives: four in a novel rubber roller gripping cage, and two on the bottom of the case. All the mounting parts (including nicely engineered clasps) are included. There's room for four 5.25in drives and a floppy, as well as a side window, if you're into showing off your hardware. There's two front-mounted USB ports, a single FireWire plus headphone and mic. From the outside the Z Machine is no-nonsense, well constructed and not hard to look at.

CONTACT	Altech
ONLINE	www.altech.com.au
MARKET	Everyone
PRICE	$599

✔ Outstanding build quality.

VERDICT ★★★★½

✖ Hot hardware might struggle.

Cooler Master COSMOS

The COSMOS is noise-reduced chassis, including sound-dampening material on the side panels and directed, ducted air flow. The air flow runs top to bottom, instead of front to back, with air drawn in from the bottom and exhausted on the top of the case.

There are four USB ports, FireWire, audio and eSATA on the front of the case. Though the COSMOS's door uses a plastic hinge, it still feels quite tough and sturdy.

The chassis uses a unique method of holding 5.25in drives in, using snap-in buttons to affix them.

CONTACT	Rectron
ONLINE	www.rectron.com.au
MARKET	Everyone
PRICE	$257

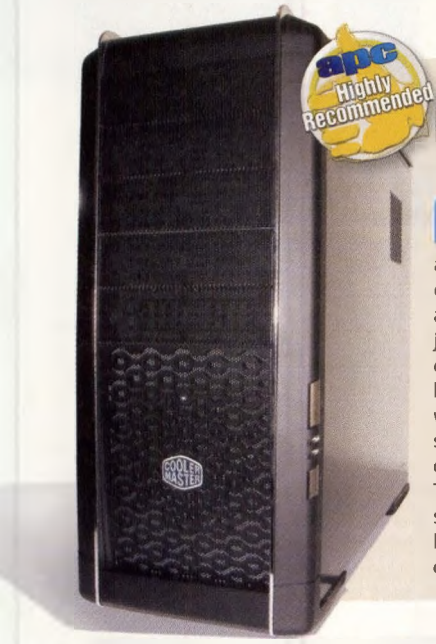
✔ 5.25in drive bay attachments.

VERDICT ★★★½☆

✖ Some components are impracticle.

3.5in drives are screwed in to removable aluminium trays, which look like server-style hot swap bays but lack any of their functionality. Top- and bottom-mounted aluminium bars keep the chassis off the desk (it has a fan in the bottom) for good air flow.

Cooler Master have an ESA version of this case in the works, which should be one of the first in the market. A minor gripe that quickly became annoying was the lack of visual alignment when putting the side of the case back on. Doing it by feel is horrible — and it took repeated attempts to get it to click in. Though the COSMOS 1000 works as a premium case, compared to the fit and finish of the SilverStone and Zalman offerings, it comes off second best.



apc Highly Recommended

Cooler Master CM690

The CM690 is one of the smaller cases on show here, as well as being one of the simpler offerings. This isn't a bad thing by any stretch — the CM690 does its job without bells and whistles. The chassis supports microATX and ATX boards (so no Extended ATX workstation users need apply) but still manages to squeeze in six hard disk drives and four optical drives. The case is almost entirely meshed, so keeping it cool shouldn't be a hard task, but keeping it quiet certainly is.

CONTACT	Rectron
ONLINE	www.rectron.com.au
MARKET	Everyone
PRICE	$86

✔ Good air flow; simple; effective.

VERDICT ★★★★☆

✖ Noisy.

The steel construction is to a good standard, there's no sharp edges, but getting the sides off and on the case can be a chore, as with any steel case. Though there's little in the way of fancy extras, the CM690 is a solid case with enough expansion room for whatever takes your fancy. Though it's one of the plainer models here, it's still well and truly up to date, including an eSATA port on the top of the case along with USB and audio connectors.

All in all, we like the CM690 — it's unassuming, yet does its job perfectly. Sometimes keeping it simple does work. Just beware there's nothing between those loud fans and your delicate ears.

Thermaltake SwordM

Now this is a crazy case. The SwordM from Thermaltake is supposedly designed using the same streamlined curves found on swords used by ancient Chinese warriors. If that kind of thing appeals, then this might be the case for you. The SwordM comes in two flavours: a standard air-cooled system and a pre-specced water-cooling case. Just add PC components.

The SwordM is a fine example of extreme over-engineering. The unit uses hydraulic cams to allow you to gently open the top of the case (not that's its required very often), along with hard-finish aluminium fins on the side panels to cool passively. The cooling in this case in general is excellent, though the air version can get a bit noisy. Consider the water-cooling version if this one appeals, just to cut down on sound.

Building in the SwordM isn't too messy, with a decent cable-routing system. There's a panel which covers the back of the PC, hiding cables and outputs from sight, but consider that if you need to plug something else in behind there, you're going to need enough room to swing open the door.

The attention to detail and construction of the case is great, but some of the features don't feel very practical. The SwordM is definitely more show than go.

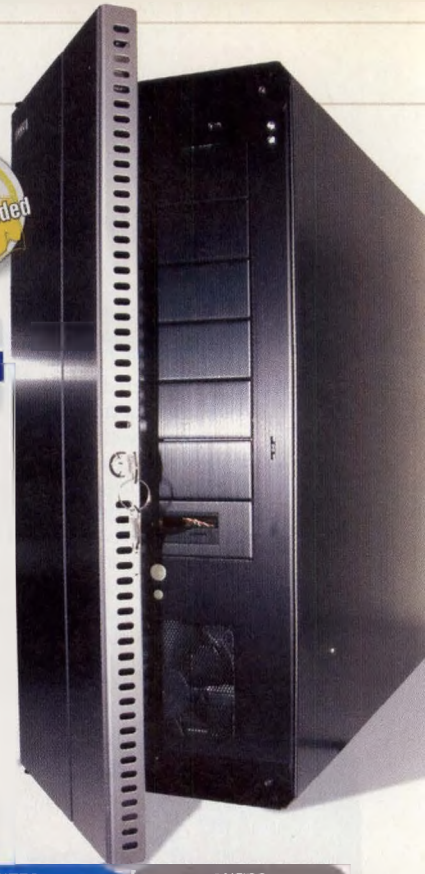
CONTACT	Anyware
ONLINE	www.anyware.com.au
MARKET	Everyone
PRICE	$699

✔ Good cable system; fine build.

VERDICT ★★★½☆

✖ A bit bizarre overall.

Lian Li PC-A10



Highly Recommended

CONTACT	Anyware
ONLINE	www.anyware.com.au
MARKET	Everyone
PRICE	$319

✔ Good design; good cooling

VERDICT ★★★★☆

✖ No eSATA; finish scratches easily.

Lian Li is very well-known as a quality PC case manufacturer. One of the first companies to move to anodised and brushed aluminium as a main construction component, it sets the bar high for good quality (and top price tags) amongst the PC enthusiast community.

The PC-A10 is not a new case from Lian Li, but as a steady seller in the market for over 12 months, it's proven itself a good buy.

The PC-A10 is an ATX-sized mid-tower case, with excellent air flow, a simple and clean design and some nifty tricks up its sleeve. The Lian Li includes a front-mounted door with (real) lock, a built-in 3-speed fan controller, a 'side'-mounted fan, which draws air from the rear of the case directly onto the hottest parts of the motherboard, and rubber-grommetted components to keep vibration noise down.

The PC-A10 is also designed to hold two PSUs for extra power in very loaded systems, but it's not necessary to install two if you don't need them.

The construction is great, it's well laid out, runs cool and looks good.

What more could you want? We could only ask for perhaps an eSATA port.

	ENERMAX CHAKRA	ZALMAN Z MACHINE GT1000	TAGAN APLUS EL DIABLO	ANTEC NINE HUNDRED	ANTEC P190
Price	$190	$599	$180	$220	$660
Size (L x W x H)	490 x 200 x 460	480 x 220 x 450	570 x 205 x 520	493 x 206 x 467	515 x 205 x 513
Material	Steel/Aluminium	Aluminium	Steel	Steel	Steel
Motherboard support	ATX; microATX	ATX; microATX	ATX; microATX; EATX	ATX; microATX	ATX; microATX; EATX
3.5in bays	5	7	7	6	7
5.25in bays	5	4	5	3	4
Front fans	1 x 120mm	2 x 92mm	1 x 250mm	2 x 120mm	1 x 120mm
Side fans	1 x 250mm	N/A	1 x 360mm	0 x 120mm (vent only)	1 x 200mm
Rear fans	0 x 120mm (vent only)	1 x 120mm	0 x 120mm (vent only)	1 x 120mm	1 x 120mm
Top fans	N/A	N/A	N/A	1 x 200mm	2 x 140mm
Front ports	2 x USB; headphone; mic; eSATA	2 x USB; 1 x FireWire; headphone; mic	2 x USB; 1 x FireWire; headphone; mic	2 x USB; 1 x FireWire; headphone; mic	2 x USB; 1 x FireWire; headphone; mic

	SILVERSTONE TJ10	COOLER MASTER COSMOS 1000	COOLER MASTER CM690	THERMALTAKE SWORDM	LIAN LI PC-A10
Price	$440	$257	$86	$699	$319
Size (L x W x H)	521 x 207 x 644	598 x 266 x 628	482 x 213 x 525	650 x 240 x 770	535 x 215 x 545
Material	Aluminium	Steel	Steel	Aluminium	Aluminium
Motherboard support	ATX; microATX; EATX	ATX; EATX	ATX; microATX	ATX; microATX; EATX	ATX; microATX
3.5in bays	7	7	6	6	5
5.25in bays	4	4	4	4	7
Front fans	1 x 120mm	0 x 120mm (vent only)	N/A	1 x 120mm	1 x 120mm
Side fans	1 x 120mm	1 x 120mm	1 x 120mm	2 x 120mm	1 x 120mm
Rear fans	1 x 120mm	1 x 120mm	1 x 120mm	2 x 120mm	1 x 120mm
Top fans	0 x 120mm (vent only)	1 x 120mm	0 x 120mm (vent only)	2 x 120mm	1 x 120mm
Front ports	2 x USB; 1 x FireWire; headphone; mic	4 x USB; 1 x FireWire; headphone; mic; eSATA	2 x USB; headphone; mic; eSATA	2 x USB; 1 x FireWire; headphone; mic; eSATA	2 x USB; 1 x FireWire; headphone; mic

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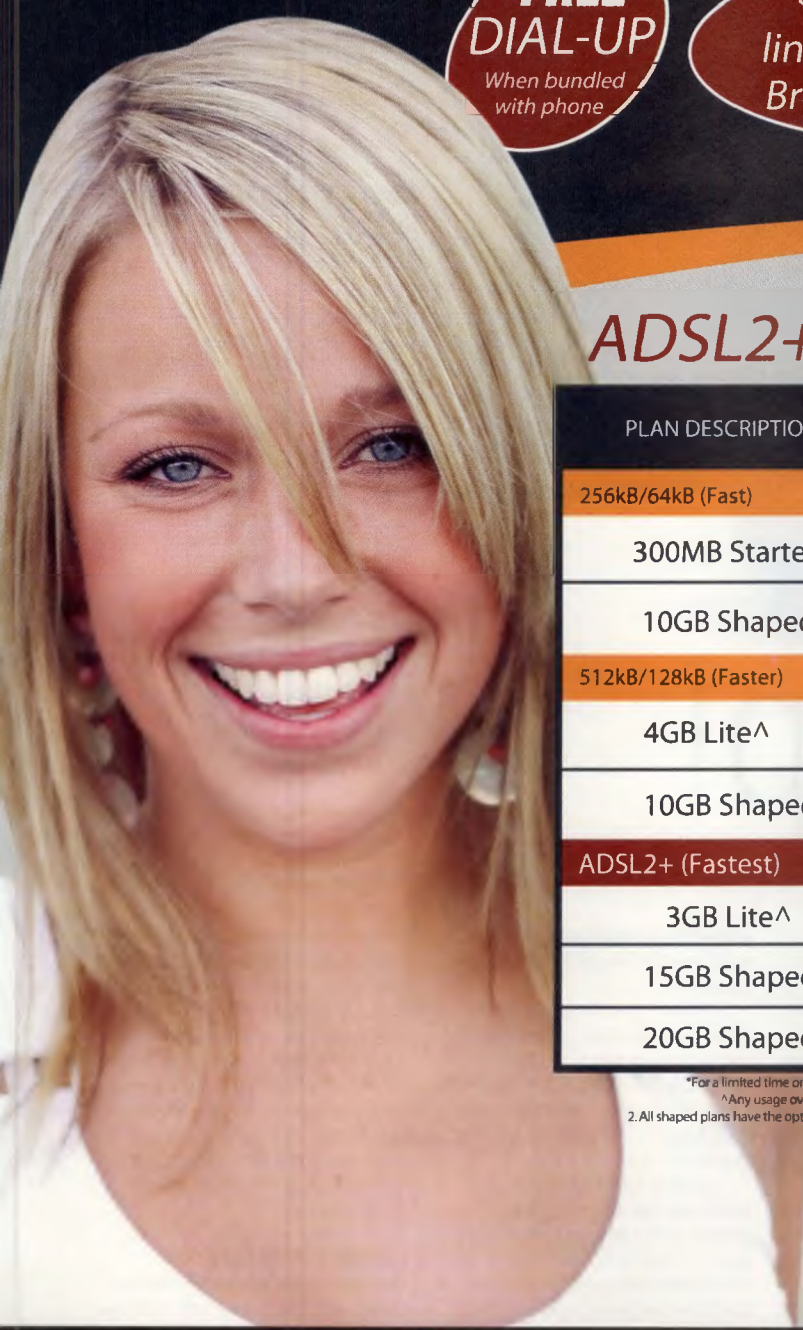

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10GB Shaped	10GB	$49.95	$39.95
ADSL2+ (Fastest)			
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Listen up!

***Anthony Caruana* takes an in-depth look at the latest in digital music players.**

In a world where the word iPod is synonymous with MP3 player it's refreshing that the market hasn't totally rolled over and given up. While all the products we looked at were MP3 players, it was heartening to see that innovation isn't dead and that while the iPod might lead all-comers on sales it's certainly not the only show in town.

Given the diversity in the MP3 player market we've decided to look at a cross-section of the market and not made direct comparisons between all the devices. It would be pointless to try and pick the better of the iPod touch and Sansa Clip. However, we've looked at each player and made a call as to whether it satisfies the market niche it's trying fill.

The notable omission from the field in Microsoft's Zune. Despite having been released in November 2006 and recently updated, the Zune is not yet being officially sold on the Aussie market. It's a pity as Microsoft is one of the few companies with the ability to compete with Apple. We contacted Microsoft but they couldn't confirm a local release date or even an approximate timeframe.

BUYING ADVICE

Choosing an MP3 player can be a confusing business. However, a few simple decisions will help cut through the confusing mass of options.

If you're planning to use your player while at the gym or during some other active pursuit then look at the smaller, lighter devices. If you spend plenty of time commuting then larger units with a screen hit the spot.

Another point of significant difference between different players is the range of accessories that are available either in the box or as aftermarket options. Some packages include cases and high quality headphones.

Although we're calling this an MP3 player roundup, support for more formats than the humble MP3 is important. These days, you can buy music in MP3, AAC, Ogg Vorbis and Windows Media formats. If you don't want to be limited then make a careful choice as the market leader, Apple's iPod, only supports MP3 and AAC audio and MPEG-4 and H.264 video. Other devices such as the Creative Zen and iRiver X20 have wider audio and video codec support.

LEADER OF THE PACK

When it comes to a player that can play music and video well then the iPod touch is the hands down winner. Throw in the ability to use it as a web tablet with it's sensational

gesture-driven UI and its PDA features and you've got a device that than can do plenty of things well. If only it offered more than 16GB of storage.

The rest of the market isn't quite so easy to choose from. Each of the units we looked had its pros and cons. We liked the Sansa Clip. It's small screen was very clear and, while it's larger than the iPod Shuffle with which it's inevitably compared, it adds an FM radio and screen to the mix at a lower price.

While we've singled two devices out for Highly Recommended awards, none could garner an "Editor's Choice". The iPod Touch came close but the limited storage for a device that can do video stopped us from giving it our highest accolade. The Sansa Clip was also close but sound quality, while good, wasn't brilliant.

HOW WE TESTED

Testing audio quality can be subjective. We used a smattering of classic tracks tracks ranging from Aerosmith to Barry Manilow to Vivaldi. We tested each unit with the supplied headphones and with a set of Sennheiser MX550 earbuds so that we could compare sound output with a common set of headphones and to make a judgement about the quality of the packaged units.

YOU CAN BUY THE MUSIC

While Microsoft CEO Steve Ballmer may not have been completely inaccurate when he said that the most common music format on the iPod was "stolen" a lot has happened in the market over recent years. There are now many choices when it comes to legally buying your music online.

Our biggest complaint – once you commit to a particular form of DRM then you're effectively trapped into a particular type of device. For example, if you buy from the iTunes Store then you're consigning yourself to Apple's iTunes/iPod combination. In our view, the only way to avoid a lock-in is to buy physical CDs and rip them. Recent legislative changes mean that this is no longer illegal.

ITUNES STORE

Shopping in the iTunes Store is very easy. Open the store from within iTunes, search for your favourite music or browse through the catalog of over 4 million tracks. Once you've made you choice, hit the Buy Now button and set up an account using your credit card or PayPal account. If you use your credit card, the iTunes Store validates that the credit card is issued in the same country as the iTunes Store you're using. That means you can't use an Aussie card to make purchases from the US store.

However, it is possible to fool the system. Create a new PayPal account using your Australian credit card but provide a US address. PayPal doesn't validate the card with your address in the same way as Apple's store. Then you'll be able to purchase movies and TV shows from the US store. Be aware though that this does mean you'll be providing some false information to PayPal.

Music from the iTunes store is encoded using the AAC format. This is an open source format over which Apple has overlaid their FairPlay DRM system. However, you can now purchase tracks that are DRM free meaning they can be played on any portable music player that supports the format.

DRM protected tracks cost $1.69, DRM free tracks are $2.29 and albums are around $16.99. There's a free track each week.

BIGPOND MUSIC

Telstra's Bigpond Music (www.bigpondmusic.com) provides excellent competition to the local iTunes Store. Tracks are protected using Microsoft's "Plays for Sure" DRM system. Many non-iPod players support this standard although if the Zune's ever released here it won't be one of them.

Creating an account was simple and you can choose to get songs delivered to both your computer and 3G mobile phone – as long as its on Telstra's network. Fill in some details and a few minutes later you'll receive an email confirming the account. Unlike the iTunes Store, there was no need to provide credit card information until we made a purchase.

Once the was account sorted, we were able to search and browse for music from the catalog of about 600,000 tracks. You can listen to a preview before purchasing although this seemed to be dependent on using Internet Explorer during our testing.

Most tracks cost $1.69 and albums are around $16.50 with a reasonable selection of $0.99 tracks and some freebies as well. Bigpond members get a $0.20 discount on tracks and downloads are unmetered.

NINEMSN MUSIC

ninemsn's music download store (music.ninemsn.com.au) was easy to navigate although some of the ads were a little annoying as they expanded if the mouse rested on them for too long.

When you create your user account you can choose to prepay. The more you pay up-front, the greater a bonus you get. For example, by purchasing a $50 credit you get a $7 bonus. $150 gets you an extra $40. You'll need to provide credit card details when you create your account.

Tracks are protected with Windows Media DRM so this isn't an iPod-friendly store.

Tracks cost $1.89 and full CDs are between $11.99 and $16.99.

iPod touch 16GB

Even though we've included the iPod touch in this line-up it's really in a class of its own. There's no device we can think of that offers the same combination of features. The touch doesn't use Windows Media Player preferring to connect to Apple's iTunes software with the proprietary Apple cable.

The touch's face has a single button that powers the device up and returns you to the home screen from any of the apps that are running. The gesture-driven interface is great. There are a few tricks to learn, like pinching when using the web browser or photo viewer to zoom in, it's very intuitive.

Video playback is spectacular through the 3.5in screen that automatically toggles between portrait and landscape depending on the content being viewed or how you're holding the device. Sound quality through the iconic white headphones was very good and we couldn't discern any difference with our test gear.

Once you throw in the Wi-Fi and web browsing as well as syncing with your calendar and address book you'll find that the touch is more than a media player. Our main complaint is that the 8 or 16GB of flash memory available is too little on a device at this price.

CONTACT Apple
ONLINE www.apple.com/au
MARKET Everyone
PRICE $549

✔ Screen; interface.
VERDICT ★★★★½
✖ Limited storage.

Creative Zen 4GB

Creative's been plugging their Zen line for some time now. With 4GB of flash memory, it's a sleek little unit. You can choose to either install Creative's Zen Media Explorer software or use Media Player to copy music back and forth and arrange playlists and the like. The Zen uses a standard USB cable for connection.

Rather than taking the traditional screen-above-buttons arrangement, the Zen is laid out in landscape with the buttons to the right of the screen. The main control is a four-way controller for adjusting volume, stopping and returning to the start of the track. There are separate play/pause and track-skipping buttons as well as a multi-function button for managing playlists.

The Zen's menu system was easy to navigate although it took several seconds for the device to be usable once switched on.

The supplied headphones delivered great sound — bass was nice and deep and distortion was minimal at high volumes. To our ears they delivered better output than our Sennheisers.

Video playback on the 2.5in display was clear with no noticeable blurring on fast moving objects. Format support includes WMV, XviD and DivX.

The Zen is available in 4GB, 8GB and 16GB models.

CONTACT Creative
ONLINE au.creative.com
MARKET Everyone
PRICE $250

✔ Nice screen.
VERDICT ★★★☆☆
✖ Slow start up.

Samsung T10 2GB

Until it's turned on, the Samsung T10 looks like a piece of plastic. Hit the power button and a set of touch controls light up giving a space age look. The button functions are easy to determine and we never needed to resort to the instructions to figure things out as the menu system was equally easy to use.

Like most of the players in this roundup, it ships with its own software or can be managed through Windows Media Player. Desktop connection is via USB and it worked without the need to install any drivers — it was truly plug and play.

Sound quality through the supplied headphones was crisp and clear and on a par with with our Senheissers. Output could be adjusted for different musical genres using the equaliser in the on-screen menu. We liked the "Rock" setting for most of our listening but there are plenty of options so most users should be able to find a mode to suit.

Video playback was reasonable. The T10's 2in screen is the smallest screen we'd want to use for video playback. Video plays in landscape mode so that movies take advantage of the widest aspect of the screen.

The T10 comes in 2GB, 4GB and 8GB models.

CONTACT Samsung
ONLINE www.samsung.com.au
MARKET Everyone
PRICE $179

✔ Easy to use.
VERDICT ★★★☆☆
✖ Small screen.

iRiver X20

The X20 is iRiver's most popular seller. Controls are easy to use although it takes some practice to control the dial that surrounds the play/pause button. There's a menu button just above the dial and the power button is below it. The controls are reasonably intuitive but the menu system was harder to use.

Desktop connectivity was easy with a USB cable — no proprietary connectors here. We were able to use Media Player to sync music and videos across without any fuss. iRiver include their own software for media management, iRiver Plus 3, as well but it wasn't any better than Media Player so we're not really sure why they bothered?

Sound quality was reasonable but we struggled to get as rich a sound through both the supplied and our test headphones. Playing with the equaliser options helped a little but getting optimum sound output takes more effort with the X20 than with other units.

Videos played nicely through the 2.2in display that can be toggled between portrait and landscape modes. It would be nice if you could toggle while watching a movie but it's not a deal-breaker in our view.

The X20 comes in 2GB, 4GB and 8GB models.

- CONTACT iRiver
- ONLINE www.iriver.com
- MARKET Everyone
- PRICE $189

✔ Nice screen.

VERDICT ★★★☆☆

✖ Sound quality.

Sony Walkman 2GB

Given the iPod's dominance it's hard to believe that Sony created the market with the original Walkman. Once we'd extracted the NWZ-A815 from it's tightly packed box that included no less than 20 booklets, leaflets and a CD, we connected it to a PC using Sony's proprietary cable. It was detected almost instantly and copying tracks over with Media Player was simple.

The user interface was easy to navigate and logically arranged — Sony's experience in simplifying complex tasks for the mobile phone market shows. There's a four-way control around the play/pause button with the volume control somewhat camouflaged on the right edge of the device.

Audio playback was the best of the bunch using the standard headphones — better than with our Sennheisers. The EX082 earbuds sat snugly in our ears and blocked out most of the ambient noise in the test lab. There are different sized ear-pieces that can be easily switched so most people should be able to customise the headphones to suit their own ears.

Video was crisp although the 2in screen was too small for much more than music videos or TV shows without grand landscapes.

- CONTACT Sony
- ONLINE www.sony.com.au
- MARKET Everyone
- PRICE $229

✔ Sensational sound.

VERDICT ★★★½☆

✖ Heavy for its size.

Sansa Clip 1GB

The Sansa Clip is cute. It's a music-only device — the crystal clear OLED screen is for text only. Desktop connectivity is via standard USB and is driver free. We just plugged it in and within a few moments the Sansa was visible in Media Player and ready to play. There's no extra software to load and the supplied mini-CD is for the manual in PDF form.

Navigation through our music collection was very easy. The small black wheel on the face lights up when clicked revealing intuitive icons for navigating the menu system. As well as the usual options for viewing music by album and artist you can create playlists on the fly and delete tracks easily.

Sound quality using the default settings was lacklustre. However, once we tweaked it with the equaliser function it was OK through the supplied headphones, although sound was far better through our test kit.

Not surprisingly, given it's name, there's a clip on the back so you can attach the unit to your coat, tie or some other article of clothing. We found it a little heavy to be worn like this.

The Sansa Clip also comes in a 2GB model.

- CONTACT Sandisk
- ONLINE www.sandisk.com
- MARKET Everyone
- PRICE $79

✔ Excellent screen; usability.

VERDICT ★★★★☆

✖ Sound quality; weight.

Notebags

Notebooks deserve better than the cases they come in. *APC* checks out some far sexier computer bags.

The problem is not that most notebooks come in boring computer cases, or not at all (like most Macbooks). It's that if you're lugging a notebook around, chances are you're having to carry two bags, one for the machine, and one for your work materials. Or if you stick the notebook in your briefcase or work bag it won't receive any special protection.

A notebook bag is defined as one whose design focuses on protecting and cushioning the notebook, mostly with high-density padding, hard-wearing materials and load-bearing stitches.

So we looked at notebook bags from two key vendors, Aussie-based STM and the US giant Belkin. STM is an Australian label which specialises in the premium end of notebook bags. It's filling the niche so well that it has opened an office in San Diego, and maintains sales offices in London, Thailand and New Zealand. Owner Adina Jacobs says STM even does "drop testing" for each new bag, to ensure that its padded notebook compartments are up to the job.

If STM is the Apple Mac of notebook bags, Belkin is the fat IBM guy in the brown suit, not as stylish, but still effective. We tested several of the key offerings from each company.

1 Medium Cargo

We liked the STM Cargo because it was surprisingly stylish for a notebook bag. It's an all purpose shoulder bag which, like many of the STM bags, has a removable laptop sleeve. As a result, it can be used as an ordinary bag after work. It's built of a washed canvas fabric, internally coated with PVC to keep the notebook weatherproof. It also has access pockets for pens, phones, PDAs and even business cards. The latptop sleeve neatly cocoons the laptop but can be easily removed.

Small (13in) —$139.95; medium (15in) — $159.95.

2 Zebra

The STM Zebra is a neoprene notebook sleeve with handles, so it can be used as a bag. The striped design is an acquired taste, probably because it's pitched at users that are younger and hipper than your reviewer, but it certainly attracted plenty of comments in the office. A sleeve basically protects a laptop against scratches or or tiny dents as you go from your office to the meeting room — but it can also be inserted into briefcases or bigger bags. By itself, we can't see it offering much protection in more serious transit.

RRP $59.95.

CONTACT STM
ONLINE www.stmbags.com.au

3 Medium Duplex

If you've got multiple notebooks of different sizes, this is the bag for you. The STM Medium Duplex has two main compartments, one of which can accommodate a padded laptop sleeve able to house a 15in laptop. But the sleeve comes with a padded wedge that can reduce the internal size of the sleeve, making it comfortably fit smaller notebooks, down to 13in ones. It also has an angled shoulder strap, two side pockets for iPod and phone, and an easy access cable/organiser pocket.

Medium (15in) graphite/rust — $129.95; large (17in) graphite/black — $139.95.

4 Large Loop

If you're a cyclist/motorcyclist, the STM Large Loop is big enough for carrying a notebook and heaps of other things for a long trip. With its 35l capacity, the Large Loop can accommodate up to a 17in notebook inside its zippered laptop section which comes with a movable false bottom to handle machines of different sizes. The laptop section is also in the centre of the back, not forcing the laptop to push against the back of the wearer. There are several padded pockets for music players, PDAs, cameras and mobile phones.

RRP $179.95.

5 Medium Evolution

The Medium Evolution is an STM backpack with an unusual feature: a hidden notebook compartment. If anyone looks inside, they won't see the notebook. The laptop compartment is concealed behind a false wall within the bag, neatly shut away under a Velcro flap. We really liked this backpack: it's big enough to fit a notebook and most things you need for a day's work and travelling, but not big enough to be bulky. It also has a built-in rain cover tucked in the base of the bag. We tested this on a trip to the UK and it kept our notebook safe.

Small (13in) — $139.95; medium (15in) — $149.95.

CONTACT Belkin
ONLINE www.belkin.com/au/

6 SLING BAG

A kind of computer bag that's been turned into a backpack, Belkin's Sling Bag will house a notebook in a compartment that's not as tight and all enveloping as the STM padded cells. But if all you want is to carry a notebook easily without actually looking like a British backpacker, then this could fit the bill. The idea of the Sling is that you carry it across your back as you travel, and then slide it around for easy access to anything you need. Could double as a bulletproof vest. Has lots of in-built pockets too.
Sling Bag 15.4in and 17in — $79.95.

7 Neoprene Sleeves

Classic foam-padded, plush-lined sleeves from Belkin which, like the STM sleeve will mostly protect your notebook from scratches and not much else. But they are also snug enough to fit inside other bags. The colours are funky but being Belkin, they're more conservative than the STM sleeves. Zippers open partly down the side, making it easy to get the notebook in and out. Good value considering the price.
Neoprene Sleeve 14in and 15.4in — $29.95; Neoprene Sleeve 17in — $39.95.

8 PHANTOM

We liked STM's Phantom. At first it looked like another shoulder bag, but it's ideal for someone who rushes from meeting to meeting everyday, carrying not just a notebook, but notepads, folders, books and whatever else. In addition to the easily accessed notebook and main compartments, it has front pockets designed to carry daily bits and pieces, from iPods to books, keys, wallets, mobile phones and more. Despite being a shoulder bag, its laptop section is padded on all sides. Again, it doesn't look like a notebook bag, which aids security.
Small (13in) red — $99.95; medium (15") black — $99.95.

9 Messenger bag

Belkin's Messenger shoulder notebook bags are tough but lightweight and come in varying sizes up to 17in models. They have two major compartments, one for a notebook and the other generic, lined with multiple pockets for MP3 players, moible phones, business cards, pens, and other accessories. There's also a separate pouch for power adapter and cables. The straps are comfortable because they are wide but light. Every colour must have its day, and right now, the Messengers, are doing their best to make it pink.
Messenger Bag 15.4in and 17in — $79.95.

The Essential

Business Technology Upgrade

Businesses are increasingly becoming more dependent on their workplace technologies in order to succeed. In an environment where integrated solutions are paramount to success, and with technology being upgraded regularly, APC Magazine will show you the latest in Business Tech to enhance productivity in your workplace.

This month, we explore Business PCs and Business Printers

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Business PCs

HP Compaq dc7800

Unlike ordinary PCs, HP's Business PCs are designed specifically to enhance a business's productivity.

Updating your personal computer fleet to a current Hewlett-Packard model can provide a productivity boost. First of all, there's faster speed. The HP dc7800 uses the latest Intel chipsets and Core 2 Duo processors for snappy performance, reducing the amount of time you and your staff sit around waiting for the computer to complete a task.

> **We are introducing some of the smallest, most powerful and energy efficient computing products on the market.**

But superior performance is of little benefit without reliability. HP PCs are designed and built to high standards, and in the event that maintenance is required, tool-less servicing means the technician can get the computer back to work in less time than is possible with conventional designs.

Furthermore, the incorporation of Intel's vPro technology means your IT department or provider can remotely set up, diagnose and fix software issues without having to physically attend the PC - even if the computer has been left switched off. That makes better use of their time and therefore helps keep ongoing costs under control, while simultaneously improving user productivity by reducing downtime.

The ability to remotely wake or power-up a PC to apply software updates means staff can be encouraged to save power by getting into the habit of switching off their computers before leaving for the night.

And if you've got better things to do with your precious desk space than share it with a computer, the slimline dc7800 has a new integrated stand and a 'zero footprint' design that can sit behind an LCD monitor, freeing up the desk for real work.

Eco-friendly practices are becoming increasingly important for many businesses, and the dc7800 can contribute in several ways.

The 80 PLUS power supply is up to 15 percent more efficient than standard power supplies, reducing electricity consumption. This also means the dc7800 runs cooler, so it puts less load on the air conditioning system, further reducing energy usage.

Similarly, the Intel Core 2 Duo chip requires less power than earlier processors to do a given amount of work, further reducing the power consumed and heat emitted.

Trimming power consumption serves the dual benefit of saving money and reducing CO2 emissions. These and other features mean the dc7800 has earned Energy Star 4.0 certification, which means it is one of the most energy-efficient enterprise-class PCs on the market.

A reduction in power consumption also means that if necessary, more computers can be installed on the premises without requiring rewiring. This was a significant consideration for one of the first local organisations to select the dc7800, Brisbane Girls Grammar School.

"The major refresh of technology in our computer labs coincided with a review of our electricity supply, so we were specifically looking for a desktop with the improved performance the students needed but also improved energy consumption to meet the school's requirements," said director of ICT Nathan Pilgrim.

"From our review we anticipate we can almost double the amount of machines on our school's electrical circuit without impacting our energy consumption," Pilgrim concluded.

"Australian businesses and educational institutions are asking for high performance computing at an affordable price both at the initial purchase point and as a result of ongoing energy bills," said Rob Kingston from the Commercial Business Unit within HP Australia's Personal Systems Group.

"The products that we are introducing have been designed to meet the needs and challenges of our customers, and this is why we are introducing some of the smallest, most powerful and energy efficient computing products on the market."

hp invent

HP recommends Windows Vista® Business

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Price

Environment

HP Compaq Business Desktop PCs have what you've been looking for straight out of the box. Designed with reliability, security and manageability in mind, our PCs are built with industry-leading technology features that will benefit your business, and your bottom line.

Some will even save on office space like the HP Compaq dc7800 Slimline Desktop, which is packed into a 46% smaller frame* and is mountable right onto the back of your monitor**. The rugged design coupled with HP's legendary performance means more reliability to help reduce your downtime. It's made with recyclable materials and an Energy Star 4 rating reduces the impact on the environment, without compromising performance.

And for even more peace of mind, it's backed by our exclusive HP Total Care services, with expert help at every stage of your computer's life. It makes HP Compaq Business Desktops the smarter choice for your business.

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*Than the HP Compaq dc7700 version. **Via Integrated Work Centre Stand.

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Business Printers

OKI C3300n

Printers can be critical to improving the productivity of your business. This is amply demonstrated by OKI's business printers.

Conventional colour laser printers are fine for everyday printing with a splash of colour - your business's logo in a letterhead, for example - but OKI's LED printing technology gives dramatically superior colour that can match the products from your local print shop. Indeed, many printing businesses use OKI for short-run colour work.

Put OKI to the test - take a colour document to an OKI showroom and have a sample printed. Then shop around and have the same document printed by competing manufacturers' devices. OKI is confident that its products will stand up to any comparison with other brands in the same class.

Couple OKI print quality with the straight-through paper path provided by the C3300n colour printer and you'll find it is possible to quickly and economically produce a wide range of jobs that would otherwise have been delegated to the print shop.

> **"The C3300n lets you switch to a 'print on demand' strategy**

Perhaps one of your employees needs business cards, but doesn't give out enough of them to be worth getting 500 printed at a time. Using special business card stock, the C3300n can produce as few as 10 cards at a time. Forget the flimsy laser or inkjet business cards of yesterday - we are talking about cards with a professional look and feel that you'd associate with those that are conventionally printed.

And the business card format can be usefully employed for marketing materials that you'd like your clients to keep in their purses or wallets - things like opening hours, lists of branches, emergency contact numbers, loyalty cards (e.g. one free coffee after buying ten), and so on.

Fed up with taping A4 sheets together to form banners? The C3300n can use special paper up to 1.2 metres long when you need to produce point of sale materials and other large items.

If you work in the hospitality industry, the C3300n is great for producing table tents - those triangular cards used to promote wine specials, beverage lists, coffee varieties, in-room movies and so on. Print a calendar on table tents and hand them out to customers to promote your business. Produce professional looking 'back soon - please wait' notices for when your reception desk is unattended.

The flexible media handling capabilities of the C3300n coupled with the great colour quality means you can get creative with your marketing and other materials. You can even produce a few samples of a proposed design to test on one or two customers before you commit to it. Doing your own printing means the sample looks exactly like the finished product - the paper stock and the print quality are precisely what you'll be using. Compare that with a mock-up produced on ordinary office paper using a laser printer: it's not what you'll be sending out to customers, so how can you trust your guinea pigs' reactions to it?

One of the problems with professionally printed brochures is that you normally have to order them in larger lots than you really need, and something always seems to change before you run out. The C3300n lets you switch to a 'print on demand' strategy where you produce just enough for the immediate need, eliminating wastage. While the raw cost per page is higher than for bulk printing, once you account for unused copies that get thrown away, the virtual elimination of lead times and the benefits of always being able to produce the sales collateral you need, on-demand printing with your C3300n can be a money saver.

While no toner-based printer can match a dedicated photo printer, OKI's Photo Enhance technology means documents incorporating photographs can be printed with professional quality, even on normal office paper.

OKI printers have won awards around the world for their reliability. This reliability comes in part from OKI's LED technology, which needs fewer moving parts than a conventional laser mechanism. Consequently, the LED print head carries a five-year warranty. Like all OKI printers, the C3300n is a quality product that will serve you for years.

OKI
PRINTING SOLUTIONS

No 1 in laser printers

It's official. OKI printers have the best print quality & reliability*.

Award winning results achieved through superior LED technology giving you sharper prints with true to life colour.

To experience dramatic superior colour for yourself visit www.oki.com.au

C5900

C8600

C3300

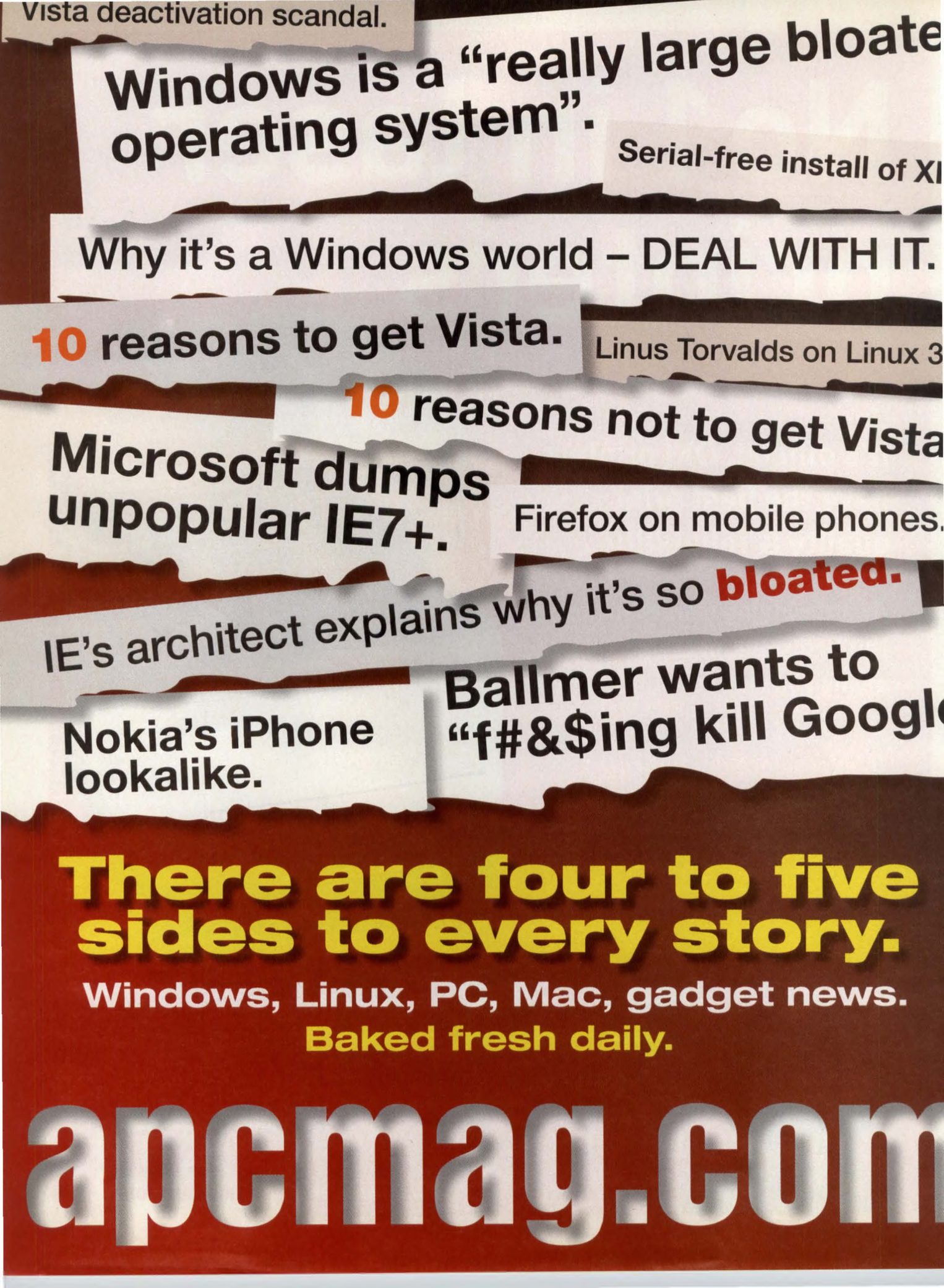
dramatically superior colour

*as voted by readers of PC Authority magazine

www.oki.com.au

OKI PRINTING SOLUTIONS

OK051


Vista deactivation scandal.
Windows is a "really large bloate
operating system".
Serial-free install of XI
Why it's a Windows world – DEAL WITH IT.
10 reasons to get Vista.
Linus Torvalds on Linux 3
10 reasons not to get Vista
Microsoft dumps
unpopular IE7+.
Firefox on mobile phones.
IE's architect explains why it's so bloated.
Ballmer wants to
"f#&$ing kill Googl
Nokia's iPhone
lookalike.
There are four to five
sides to every story.
Windows, Linux, PC, Mac, gadget news.
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Optus jacks up broadband price

Price rises and the introduction of $150/GB excess usage fees are among the Christmas presents Optus gave new customers.

Optus has taken the unusual step of raising the prices on its popular home phone and broadband plans, making them considerably less attractive.

The $69 plan which offered 2GB of broadband usage and unlimited calls to national landlines and Optus mobiles now costs $79. And, after years of promoting its 'shaped' speed service — where the connection speed just slows down if you go over your limit — as the more honourable option, the number two telco has caved to the lure of charging customers bucket loads in excess usage fees and is charging $150 per gigabyte of overusage. Other ISPs like Netspace and Internode have developed popular "data blocks" systems where people who accidentally go over their plan limit can buy a block of expensive but not unreasonably priced extra data to keep their connection going at full speed.

Funny that their mascot is an animal that looks like it's wearing a mask!

To its credit, Optus has applied an upper limit of $300 on excess usage charges, unlike BigPond which applies no maximum and has billed customers thousands of dollars in excess fees for a single month's usage. Optus also plans to offer usage alerts via SMS, so customers don't have to remember to log in and check.

Customers who had already signed up to the original plans will not be forced to switch to the new ones.

The change comes on top of Optus introducing charging for uploads as well as downloads — another unpopular practice led by BigPond, but now dopted by some plans from iiNet, AAPT, Dodo and others.

Optus subsidiary Virgin Broadband, which had been offering a 4GB HSDPA wireless broadband plan including unlimited national phone calls and calls to Virgin Mobiles for $60 also recently halved its data allowance to 2GB. Existing Virgin Broadband customers will continue to get 4GB a month, but new customers will have to pay $70 if they want the 4GB allowance rather than the 2GB one.

your monthly broadband guide

APC is proud to partner with the independent broadband price-monitoring service Broadband Choice (***broadbandchoice.com.au***) to bring you the best ADSL and cable deals.

The comparison table on the following pages focuses on internet service providers that best serve the majority of *APC* readers' needs – those that have national coverage (though we have included some ISPs that provide higher than 2Mb/s speed services in limited areas).

Only those meeting at least three of our four plan selection criteria are listed:

Budget plan: cheapest deal under $35/month.

Light plan: cheapest deal under $60/month, with at least 512Kb/s speed and 1GB data.

Family plan: largest download allowance under $80/month, at least 512Kb/s and 10GB data.

High-speed: cheapest 1.5Mb/s plan under $100/month, with 10GB data minimum.

If an ISP has "unlimited downloads" but speed is throttled after reaching a certain limit, the portion in which you can get full-speed downloads is listed as its limit.

APC has picked the lowest price for a contract period of six months or less for broadband installation. Otherwise, the lowest-priced option was selected.

The installation price doesn't include a modem because you may find you'll get better value by buying one separately.

Can't find your provider in our list? That's because some of the largest ISPs, and many smaller ones, didn't meet the selection criteria. There may be ISPs we didn't list that will provide better deals (but which only service your local area or state).

ISPs enter their own information into the Broadband Choice database. ISPs can contact bc@whirlpool.net.au for more details on how to become part of the database.

Data for our table was extracted from the Broadband Choice database on 6 December 2006.

in brief

OUR WAY OR THE HIGHWAY: TELSTRA

Remember Labor's pre-election promise to invest $4.7 billion of taxpayer funds into building a fibre broadband network, in collaboration with a telco? Telstra says it still wants the money, thanks very much, but won't let the government have any control over the network. "If they want to go in that direction they can go in that direction – they've got Optus and boptus and coptus and all kinds of other companies around here that they can do consortiums and joint ventures with," said the telco's public policy head Phil Burgess. "We're not going to do consortiums and equity with government and things like that – it's not the way we do things."

END OF RESTRICTIVE INTERNET PROXIES

Broadband over HSDPA mobile networks is now cheaper than via an ADSL connection, so there's really no need to be forced to go through your employer's restrictive internet connection. Plug one of these cheap mobile plans into your laptop (or work PC) and bingo, unrestricted net access at work. Vodafone's Christmas special was $39 for 5GB. 3's Christmas special was $14.50 for 1GB, $24.50 for 2GB, $34.50 for 3GB and so on. Optus' was $39.99 for 2GB.

Name	Online	Budget plan (under $35)	Light plan (under $60, at least 512Kb/s, minimum 1GB data limit)	Family plan (under $80, at least 512Kb/s, minimum 10GB data limit)	High-speed plan (under $100, at least 1.5Mb/s, minimum 10GB data limit)	National	Spam filtering	Setup fee and contract length	Rapid transfer
Super-fast broadband ISPs (faster than 1.5Mb/s)									
aaNet ADSL2+	www.aanet.com.au	$19.90†* 1GB+ 24 Mb/s	$39.90†* 8GB+ 24 Mb/s	$49.90†* 16GB+ 24 Mb/s	$79.90†* 32GB+ 24 Mb/s	✘	✘	$119 12mths	✘
AAPT LiveNet ADSL2+	http://home.aapt.com.au	$29.95† 1GB^ 24 Mb/s	$39.95† 5GB^ 24 Mb/s	$59.95† 20GB^ 24 Mb/s	N/A	✘	✔	$100 1mth	✘
AuNix ADSL 2	www.aunix.com.au	N/A	$44.95† 20GB+^ 24 Mb/s	$59.95† 30GB+^ 24 Mb/s	$59.95† 30GB+^ 24 Mb/s	✔	✔	$155 12mths	✔
BKB Home ADSL2+ Preferred	www.bkb.net.au	N/A	$44.95† 10GB 24 Mb/s	$59.95† 25GB 24 Mb/s	$79.95† 40GB 24 Mb/s	✘	✔	$89.95 12mths	✘
BKB Home ADSL2+ Standard	www.bkb.net.au	N/A	$59.95† 5GB 24 Mb/s	$69.95† 15GB 24 Mb/s	$99.95† 40GB 24 Mb/s	✘	✔	$89.95 12mths	✘
Blackstump ADSL2	www.blackstump.net.au	N/A	$44.95† 20GB+ 2 Mb/s	$59.95† 30GB+ 4 Mb/s	$59.95† 30GB+ 4 Mb/s	✔	✔	$129.95 12mths	✔
Comcen ADSL2+	www.comcen.com.au	$19.95† 1GB 24 Mb/s	$39.95† 5GB+ 24 Mb/s	$69.95† 40GB 24 Mb/s	$69.95† 40GB 24 Mb/s	✘	✔	$50 12mths	✘
Comstech Systems ADSL2+	www.comstech.com.au	N/A	$51.50† 5GB 24 Mb/s	$66.95† 25GB 24 Mb/s	$77.50† 50GB 24 Mb/s	✔	✔	$133.95 6mths	✔
Dodo Super Fast ADSL2+	www.dodo.com.au	$9.99†* 1GB+^ 24 Mb/s	$29.99†* 5GB+^ 24 Mb/s	$49.99†* 15GB+^ 24 Mb/s	N/A	✘	$1.90	$129.99 1mth	✘
Dodo High Speed ADSL2+	www.dodo.com.au	$29.99†* 1GB+^ 24 Mb/s	$39.99†* 5GB+^ 24 Mb/s	$59.99†* 15GB+^ 24 Mb/s	N/A	✘	$1.90	$129.99 1mth	✘
Empcom ADSL2+	www.empcom.net	N/A	$59.95 20GB 24 Mb/s	$59.95 20GB 24 Mb/s	$89.95 40GB 24 Mb/s	✘	✘	$129 6mths	✘
EscapeNet ADSL2+	www.esc.net.au	$19.90† 500MB 24 Mb/s	$39.90† 5GB 24 Mb/s	$59.90† 25GB 24 Mb/s	$89.90† 50GB 24 Mb/s	✔	✔	$0 12mths	✔
G-node ADSL2+	www.g-node.com.au	N/A	$39.90† 5GB 24 Mb/s	$69.90† 40GB 24 Mb/s	$69.90† 40GB 24 Mb/s	✘	✔	$0 12mths	✔
Green Tree Frog ADSL 2+ ULL	www.greentreefrog.net.au	$29.95† 2GB 24 Mb/s	$39.60† 5GB 24 Mb/s	$66† 20GB 24 Mb/s	$99† 40GB 24 Mb/s	✘	✔	$0 12mths	✘
iiNet broadband2+ ADSL (24Mbit)	www.iinet.net.au	$29.95† 500MB+ 24 Mb/s	$49.95† 7GB+ 24 Mb/s	$69.95† 20GB+ 24 Mb/s	$99.95† 40GB+ 24 Mb/s	✘	✔	$79.95 6mths	✘
ISP ADSL2+	http://w3.isp.net.au	N/A	$36.30†* 16GB 24 Mb/s	$69.30†* 42GB 24 Mb/s	$69.30†* 42GB 24 Mb/s	✘	✔	$145.65 6mths	✘
Internode Extreme ADSL2+	www.internode.on.net	N/A	$59.95 20GB 24 Mb/s	$59.95 20GB 24 Mb/s	$74.95 30GB 24 Mb/s	✘	✔	$129 6mths	✘
iSage ADSL 2	www.isage.net.au	N/A	$44.95† 20GB+ 24 Mb/s	$59.95† 30GB+ 24 Mb/s	$59.95† 30GB+ 24 Mb/s	✔	✔	$155 12mths	✔
Koala Residential ADSL2+	www.koalatelecom.com.au	N/A	$44.95† 5GB+ 24 Mb/s	$69.95† 20GB+ 24 Mb/s	$89.95† 30GB+ 24 Mb/s	✔	✔	$149.95 6mths	✘
Koala Usenet Dedicated	www.koalatelecom.com.au	N/A	$49.95† 30GB 24 Mb/s	$59.95† 50GB 24 Mb/s	$49.95† 30GB 24 Mb/s	✔	✔	$149.95 6mths	✔
Netspace Home ADSL2+	www.netspace.net.au	$9.95†* 500MB 24 Mb/s	$39.95† 5GB+ 24 Mb/s	$69.95† 20GB+ 24 Mb/s	$89.95† 30GB+ 24 Mb/s	✘	✔	$99 6mths	✘
Netspace SOHO ADSL2+	www.netspace.net.au	N/A	$49.95† 5GB 24 Mb/s	$59.95† 10GB 24 Mb/s	$99.95† 30GB 24 Mb/s	✘	✔	$99 6mths	✘
OptusNet Cable	http://personal.optus.com.au	N/A	$59.99† 15GB^ 10 Mb/s	$59.99† 15GB^ 10 Mb/s	$99.99† 30GB^ 10 Mb/s	✘	✔	$188 12mths	✘
OptusNet DSL Direct	http://personal.optus.com.au	N/A	$59.99† 15GB^ 24 Mb/s	$59.99† 15GB^ 24 Mb/s	$99.99† 30GB^ 24 Mb/s	✘	✔	$188 12mths	✘
PrimusNET up to 8000Kbps	www.primus.com.au	$29.95† 1GB 8 Mb/s	$49.95† 5GB 8 Mb/s	$69.95† 20GB 8 Mb/s	$89.95† 40GB 8 Mb/s	✘	$4	$118 1mth	✘
PrimusNET ADSL2+	www.primus.com.au	$29.95† 1GB+ 24 Mb/s	$49.95† 7GB+ 24 Mb/s	$69.95† 12GB+ 24 Mb/s	N/A	✘	$4	$0 12mths	✘
Rabbit Net ADSL2+	http://rabbit.com.au	$29.95†* 5GB 24 Mb/s	$29.95†* 5GB 24 Mb/s	$49.95†* 15GB 24 Mb/s	$79.95†* 30GB 24 Mb/s	✘	✔	$42.50 12mths	✘
Soul ADSL2+	http://https:	$34.95† 2GB+ 24 Mb/s	$44.95† 5GB+ 24 Mb/s	$69.95† 30GB+ 24 Mb/s	$69.95† 30GB+ 24 Mb/s	✘	✔	$119 12mths	✘
Spin ADSL2+	www.spin.net.au	$19.95† 1GB^ 24 Mb/s	$39.95† 5GB+ 24 Mb/s	$69.95† 40GB 24 Mb/s	$69.95† 40GB 24 Mb/s	✘	✔	$50 12mths	✘
SuperNerd ADSL2+	www.supernerd.com.au	$20† 1GB 24 Mb/s	$30† 5GB 24 Mb/s	$70† 45GB 24 Mb/s	$60† 35GB 24 Mb/s	✘	✔	$55 12mths	✔
TPG Residential ADSL2+	www.tpg.com.au	$29.99* 600MB 24 Mb/s	$49.99 18GB+ 24 Mb/s	$69.99 40GB+ 24 Mb/s	$59.99 30GB+ 24 Mb/s	✘	✔	$59.95 12mths	✘
Vintek 20000k ADSL 2+	www.vintek.net	N/A	$59.95 20GB 24 Mb/s	$59.95 20GB 24 Mb/s	$89.95 40GB 24 Mb/s	✘	✔	$129 6mths	✘
Westnet Broadband2+	www.westnet.com.au	$29.95†* 500MB 24 Mb/s	$49.95† 5GB+ 24 Mb/s	$69.95† 10GB+ 24 Mb/s	N/A	✘	$0.83	$139 12mths	✘
Wix ADSL2+	www.wix.com.au	N/A	$39.95† 5GB 24 Mb/s	$59.95† 20GB 24 Mb/s	$99.95† 50GB 24 Mb/s	✘	✔	$0 12mths	✔
Regular broadband ISPs (1.5Mb/s or less)									
.Netcall ADSL (Bundled)	www.netcall.com.au	$24.90†* 2GB+ 256Kb/s	$44.90†* 16GB+ 1.5 Mb/s	$54.90†* 24GB+ 1.5 Mb/s	$84.90†* 32GB+ 8 Mb/s	✔	✔	$145 12mths	✔
.Netcall ADSL (Unbundled)	www.netcall.com.au	$29.90* 2GB+ 256Kb/s	$49.90* 16GB+ 1.5 Mb/s	$59.90* 24GB+ 1.5 Mb/s	$89.90* 32GB+ 8 Mb/s	✔	✔	$145 12mths	✔
aaNet ADSL (Bundled)	www.aanet.com.au	$24.90†* 2GB+ 256Kb/s	$44.90†* 16GB+ 1.5 Mb/s	$54.90†* 24GB+ 1.5 Mb/s	$84.90†* 32GB+ 8 Mb/s	✔	✘	$145 12mths	✔

Regular broadband ISPs (1.5Mb/s or less)

Name	Online	Budget plan (under $35)	Light plan (under $60, at least 512Kb/s, minimum 1GB data limit)	Family plan (under $80, at least 512Kb/s, minimum 10GB data limit)	High-speed plan (under $100, at least 1.5 Mb/s, minimum 10GB data limit)	National	Spam filtering	Setup fee and contract length	Rapid transfer
aaNet ADSL (Unbundled)	www.aanet.com.au	$29.90* 2GB+ 256Kb/s	$49.90* 16GB+ 1.5 Mb/s	$59.90* 24GB+ 1.5 Mb/s	$89.90* 32GB+ 8 Mb/s	✔	✘	$145 12mths	✔
AAPT Broadband	http://home.aapt.com.au	$34.95† 1GB^ 256Kb/s	$59.95† 15GB^ 1.5 Mb/s	$59.95† 15GB^ 1.5 Mb/s	N/A	✔	✔	$100 1mth	✔
AuNix ADSL	www.aunix.com.au	$29.95† 15GB 256Kb/s	$59.95† 20GB+ 1.5 Mb/s	$59.95† 20GB+ 1.5 Mb/s	$74.95† 35GB 1.5 Mb/s	✔	✔	$99 6mths	✔
Australia On Line ADSL	www.australiaonline.net.au	$29.95 1GB+ 256Kb/s	$49.95 5GB 1.5 Mb/s	$64.95 10GB 1.5 Mb/s	N/A	✔	✔	$99 6mths	✔
Australis Internet ADSL	www.australis.net	$34.95 1GB 256Kb/s	$59.95 30GB+ 1.5 Mb/s	$59.95 30GB+ 1.5 Mb/s	$59.95 30GB+ 1.5 Mb/s	✔	✔	$139 1mth	✔
Beagle Internet ADSL	www.beagle.com.au	$29.95 1GB 256Kb/s	$56.95 5GB 1.5 Mb/s	$68.95 15GB 1.5 Mb/s	$79.95 50GB 1.5 Mb/s	✔	✔	$157 1mth	✔
Blackstump ADSL	www.blackstump.net.au	$34.95 5GB 256Kb/s	$57.95 5GB 1.5 Mb/s	$69.95 15GB 1.5 Mb/s	$79.95 No limit 1.5 Mb/s	✔	✔	$108 6mths	✔
Blackstump ADSL Bundles	www.blackstump.net.au	$34.95†* 500MB 512Kb/s	$47.95† 5GB 1.5 Mb/s	$69.95† 15GB 1.5 Mb/s	$79.95† No limit 1.5 Mb/s	✔	✔	$108 6mths	✔
BBI Flat Rate DSL	www.brownbear.net.au	$32.95 2GB 256Kb/s	$56.95 5GB 1.5 Mb/s	$69.95 25GB 1.5 Mb/s	$79.95 35GB 1.5 Mb/s	✔	✔	$119 6mths	✔
BBI Excess DSL	www.brownbear.net.au	$32.95* 2GB 256Kb/s	$56.95* 5GB 1.5 Mb/s	$69.95* 25GB 1.5 Mb/s	$79.95* 35GB 1.5 Mb/s	✔	✔	$119 6mths	✔
Brown Bear DSL/ Phone	www.brownbear.net.au	$19.95†* 1GB 256Kb/s	$54.95† 5GB 1.5 Mb/s	$64.95† 25GB 1.5 Mb/s	$74.95† 35GB 1.5 Mb/s	✔	✔	$119 6mths	✔
Chariot ADSL	www.chariot.net.au	$29.95 1GB 256Kb/s	$49.95 10GB 1.5 Mb/s	$69.95 25GB 1.5 Mb/s	$79.95 40GB 1.5 Mb/s	✔	✔	$110 6mths	✔
Comcen Internet ADSL	www.comcen.com.au	$29.95† 10GB 256Kb/s	$44.95†* 5GB+ 1.5 Mb/s	$69.95† 20GB+ 1.5 Mb/s	$99.95† 30GB+ 1.5 Mb/s	✔	✔	$99 6mths	✔
Concept Networks ADSL	www.conceptual.net.au	$29.95* 500MB 256Kb/s	$59.95* 5GB 1.5 Mb/s	$69.95* 15GB 1.5 Mb/s	$89.95 30GB 1.5 Mb/s	✔	✔	$99 6mths	✔
Data Oz Residential ADSL	www.dataozsolutions.com.au	$34.95 2.5GB+ 256Kb/s	$49.95 5GB+ 1.5 Mb/s	$64.95 15GB+ 1.5 Mb/s	$84.95 30GB+ 1.5 Mb/s	✔	✔	$159.95 6mths	✔
Dinkum Internet ADSL	www.dinkum.net.au	$34.95 1GB 256Kb/s	$59.95 5GB 1.5 Mb/s	$69.95 15GB 1.5 Mb/s	$89.95 50GB 1.5 Mb/s	✔	✔	$129 6mths	✔
Dodo ADSL	www.dodo.com.au	$19.99†* 500MB+^ 256Kb/s	$39.99†* 5GB+^ 1.5 Mb/s	$59.99†* 15GB+^ 1.5 Mb/s	N/A	✔	$1.90	$129.99 1mth	✔
EFTel ADSL	http://w3.eftel.com	$19.95†* 500MB 256Kb/s	$59.95†* 7GB 1.5 Mb/s	$69.95†* 25GB+ 1.5 Mb/s	N/A	✔	✔	$125 12mths	✔
EscapeNet ADSL Home	www.esc.net.au	$29.90 500MB 256Kb/s	$49.90 5GB 1.5 Mb/s	$69.90 25GB 1.5 Mb/s	$99.90 50GB 1.5 Mb/s	✔	✔	$99 6mths	✔
eTelecom ADSL	www.etelecom.com.au	$29.95†* 1GB 256Kb/s	$59.95†* 5GB 1.5 Mb/s	$69.95†* 15GB 1.5 Mb/s	N/A	✔	✔	$99 12mths	✔
Hotkey Internet ADSL	www.hotkey.net.au	$34.95* 1GB 1.5 Mb/s	$44.95* 5GB 1.5 Mb/s	$69.95 12GB 1.5 Mb/s	N/A	✔	✔	$59 12 mths	✔
ISP ADSL	http://w3.isp.net.au	$33* 3GB 256Kb/s	N/A	$69.30* 25GB 1.5 Mb/s	$88* 30GB 8 Mb/s	✔	✔	$132 6mths	✔
Internode Home ADSL	www.internode.on.net	N/A	$49.95 5GB 1.5 Mb/s	$69.95 20GB 1.5 Mb/s	$84.95 30GB 1.5 Mb/s	✔	✔	$129 6mths	✔
iSage Internet ADSL	www.isage.net.au	$34.95 15GB+ 256Kb/s	$59.95† 20GB+ 1.5 Mb/s	$59.95† 20GB+ 1.5 Mb/s	$79.95 35GB+ 1.5 Mb/s	✔	✔	$99 6mths	✔
iTEL ADSL	www.itel.net	$29.95†* 500MB 256Kb/s	$59.95†* 5GB 1.5 Mb/s	N/A	$79.95† 60GB 1.5 Mb/s	✔	✔	$129 12mths	✔
Koala Residential ADSL1	www.koalatelecom.com.au	$34.95† 2.5GB+ 256Kb/s	$49.95† 5GB+ 1.5 Mb/s	$69.95† 15GB+ 1.5 Mb/s	$89.95† 30GB+ 1.5 Mb/s	✔	✔	$149.95 6mths	✔
Koala Business ADSL1	www.koalatelecom.com.au	$34.95†* 2GB+ 512Kb/s	$49.95†* 7GB+ 1.5 Mb/s	$59.95†* 15GB+ 1.5 Mb/s	$79.95†* 30GB+ 1.5 Mb/s	✔	✔	$149.95 6mths	✔
Lizzy ADSL	www.lizzy.com.au	$29.95 1GB+ 256Kb/s	$49.95 5GB 1.5 Mb/s	$64.95 10GB 1.5 Mb/s	N/A	✔	✔	$99 6mths	✔
Netspace Home ADSL	www.netspace.net.au	$29.95† 10GB+ 256Kb/s	$39.95† 5GB+ 1.5 Mb/s	$69.95† 20GB+ 1.5 Mb/s	$99.95† 30GB+ 1.5 Mb/s	✔	✔	$99 6mths	✔
NetSpeed ADSL	www.netspeed.com.au	$29.95†* 1GB+ 256Kb/s	$54.95†* 5GB+ 1.5 Mb/s	$64†* 10GB+ 1.5 Mb/s	N/A	✔	$2	$139 12mths	✔
Pacific Internet DSL	www.pacific.net.au	$29.95† 3GB 256Kb/s	$49.95 5GB 1.5 Mb/s	$49.95† 10GB 1.5 Mb/s	N/A	✔	✔	$99 6mths	✔
Primus Flexible Broadband	www.primus.com.au	$24.95† 500MB 256Kb/s	$54.95† 5GB 1.5 Mb/s	$69.95† 20GB 1.5 Mb/s	N/A	✔	$4	$118 1mth	✔
Rabbit Internet ADSL	http://rabbit.com.au	$28.95†* 500MB 256Kb/s	$58†* 5GB 1.5 Mb/s	$70†* 30GB 1.5 Mb/s	$70†* 30GB 1.5 Mb/s	✔	✔	$104.50 6mths	✔
Soul ADSL	www.mysoul.com.au	$29.95 No limit 256Kb/s	$59.95† 10GB+ 1.5 Mb/s	$59.95† 10GB+ 1.5 Mb/s	N/A	✔	✔	$119 12mths	✔
Spin Internet	www.spin.net.au	$29.95† 10GB 256Kb/s	$44.95†* 5GB+ 1.5 Mb/s	$69.95† 20GB+ 1.5 Mb/s	$99.95† 30GB+ 1.5 Mb/s	✔	✔	$99 6mths	✔
SuperNerd SuperDSL	www.supernerd.com.au	$26.95 1GB 256Kb/s	$59.95 15GB 1.5 Mb/s	$59.95 15GB 1.5 Mb/s	$72.95 30GB 1.5 Mb/s	✔	✔	$115 6mths	✔
TalkTODAY ADSL	www.talktoday.com.au	$29.95† 500MB^ 256Kb/s	$54.95† 5GB^ 1.5 Mb/s	$69.95† 30GB^ 1.5 Mb/s	$69.95† 30GB^ 1.5 Mb/s	✔	✔	$119 6mths	✔
TSN Broadband	www.tsninternet.com.au	N/A	$49.95 5GB 1.5 Mb/s	$69.95 20GB 1.5 Mb/s	$99.95 40GB 1.5 Mb/s	✔	✔	$129 6mths	✔
Vintek Personal ADSL	www.vintek.net	N/A	$49.95 5GB 1.5 Mb/s	$69.95 20GB 1.5 Mb/s	$99.95 40GB 1.5 Mb/s	✔	✔	$129 6mths	✔
Water Sprite ADSL1 Shaped plans	www.watersprite.net.au	$35 2GB 256Kb/s	$60 5GB 1.5 Mb/s	$70 15GB 1.5 Mb/s	$84 35GB 1.5 Mb/s	✔	✔	$150 6mths	✔
Water Sprite ADSL1 Excess charged plans	www.watersprite.net.au	$35* 2GB 256Kb/s	$60* 5GB 1.5 Mb/s	$70* 15GB 1.5 Mb/s	$84* 35GB 1.5 Mb/s	✔	✔	$150 6mths	✔
Westnet Broadband1	www.westnet.com.au	$29.95† 500MB 256Kb/s	$59.95† 10GB+ 1.5 Mb/s	$69.95† 20GB+ 1.5 Mb/s	$99.95† 40GB+ 1.5 Mb/s	✔	$0.83	$99 6mths	✔

*Key: * ISP charges excess usage fees when you exceed your download limit; † This price only available if bundled with long distance telephony from the ISP; + Additional download allowance available with this plan for use in off-peak periods; ^ ISP combines sent and received data when calculating usage.*

Hottest tech for 2008

With 2008 upon us, *James Morris* evaluates the major releases for the year and plots how your PC's hardware and software could develop.

Technology companies keep their cards close to their chest. For example, although we had an inkling as far back as early 2006 that AMD might be planning a triple-core processor, it was still quite a surprise when this was announced in September. No company can completely keep its future technologies secret, nor do most of them want to. Although most companies won't tell you more than a few months in advance precisely what they have planned, you can usually get the information out of somebody, so what follows is our findings for what's in store for 2008, which could plot the shape of your next PC. We also unveil some other technology developments due in 2008.

NEW PROCESSOR ARCHITECTURES

The big news of 2007 was quad-core. Arriving at the tail end of 2006, the technology is taking its time to filter down — and that will continue into 2008. So there's not likely to be an increase in the number of cores for most of next year, just the availability of cheaper quad-core systems. Still, as we saw over the Christmas preparations, there were a few launches which will shape the coming year profoundly.

Intel has just released its next generation, the processors formerly known as Penryn. The core itself is a tweak of Core 2, although the real headline news is the move to a 45nm production process. Previous Intel processors used 65nm, so the same core would now take up only half the area. However, Penryn does have a few more transistors — over 400 million for a dual-core part, compared with less than 300 million for the original Core 2 Duo design. Most of the extra transistors have been used to increase the Level 2 cache to 6MB per core pair, for a total of 12MB on the quad-core version. It was just over a decade ago that the PC itself had this much system memory inside it! Other technologies have also contributed to the increased transistor count, in particular SSE4, which adds 47 new instructions. Then there's the Super Shuffle engine and the Radix-16 Divider.

Although the new core is codenamed Penryn, the desktop parts have their own codenames: Yorkfield for the quad-core (the first desktop part to arrive) and Wolfdale for the dual-core. The new Core 2 Extreme QX9650 runs at 3GHz, the same as its QX6850 predecessor.

So the first Intel releases for 2008 will be Penryn for the masses. Although the QX9650 was the first to arrive, it will be followed in January by a slew of lesser Yorkfields and Wolfdales. The Yorkfield clockspeeds will range from 2.5GHz to 2.83GHz, and the Wolfdale dual-core CPUs from 2.66 to 3.16GHz. But that's just the beginning.

Like all die shrinks, Penryn has another welcome trick up its sleeve for 2008. Although the QX9650 is rated for a 130W TDP (Thermal Design Power), as was the case with its QX6850 predecessor, our testing has shown that this is Intel erring a little on the cautious side: it consumes as much as 60W less than its predecessor on a like-for-like platform.

FACT FILE!

DDR3 running at 1,600MHz offers 50 per cent more bandwidth than DDR2 running at 1,066MHz, although the latency is a similar amount higher.

THE APPLE IPHONE IS ABOUT TO HIT AUSTRALIAN SHORES IN A GENERATION 2 VERSION THAT TRULY PUTS THE NET IN YOUR POCKET.

Apple's groundbreaking iPhone was only an entrée: around June this year, Apple will release the second generation iPhone, with 3G capabilities. This is the version Australia will be getting. "So what?" you might say — "heaps of phones have 3G – what's special about Apple offering it?"

The answer lies in the fact that the iPhone is about as close to a full blown computer-in-your-pocket that the world has ever seen. In fact, with its OS X operating system, it is basically a micro-sized Mac. Its web browser is the full Apple Safari browser, and Apple has stuffed six processing cores into the phone's remarkably slim casing to provide faster than ever before mobile web rendering.

Loading web pages on the first gen iPhone was an exercise in patience, because the GPRS/EDGE capabilities of the phone only provided a data connection of between dialup and twice dialup speed. With many web pages measuring in hundreds of kilobytes or even megabytes, the phone's fast processors could only sit and wait for data to arrive. Apple will doubtlessly build 3G High Speed Packet Access (HSPA) technology into the iPhone, a 3G connectivity standard offered by all the major networks in Australia, with speeds of up to 3.6Mbit/s.

Of course, fast processor speed alone doesn't makes the iPhone great. It's the sensitive multi-touch screen, coupled with a user interface entirely designed around touch (not as an add-on afterthought). For example, when viewing a web page, double-tapping a column of text zooms right in on it. Double tap to zoom out to see the whole page again. Pinch your fingers across the screen on a web page or photograph to zoom in precisely... it's quite incredible.

In our view, the iPhone will be the tipping point at which the mobile web becomes truly viable and attractive.

Dan Warne

Overclockers have already managed to push this processor to 4.5GHz with air cooling and 6GHz using liquid nitrogen. So we can expect faster Penryns in 2008 to keep pace with whatever AMD has to offer. A Core 2 Extreme QX9770, running at 3.2GHz with a 1,600MHz FSB, has already been rumoured for early 2008.

At the Intel Developer Forum in September last year, Intel also demonstrated working chips using its next step in process technology, 32nm. This will yet again halve the area taken up by the same number of transistors. However, although we may get the chance to see engineering samples filtering through at the tail end of 2008, this will very much be a technology for 2009. With AMD so far behind in this respect, Intel certainly isn't going to find itself in a huge hurry to rush out its next generation, although the benefits for both Intel and end-users will be as clear for this die shrink as any other.

AMD'S RETURN TO FORM

AMD would seem to be lagging behind the processor race with its 'Stars' processors (so-called because their codenames are derived from the names of stars or constellations). Although we have already seen the Opteron version of the Barcelona core, only a smattering of desktop 'Agena' variants currently have seen the light of day. A total of three quad-core Phenoms have appeared on the market so far — the 9700, 9600 and 9500, running at 2.4GHz, 2.3GHz and 2.2GHz respectively. These are all Socket AM2+ processors, so will be able to fit on existing motherboards on the market (the first board and chip are reviewed on page 30).

The flagship FX parts are currently not available as we go to press, but we should see the first Phenom FXs, including for the dual-socket Quad FX platform — the Phenom FX-90 series — early this year. We haven't received precise clock details just yet, but the FXs should be timed at 2.6GHz or higher. At the same time, the Barcelona core will be spun down to dual-core Phenom 6000 series (Kuma) and the entry-level Athlon X2 and Sempron lines in the shape of Rana and Spica. The former will be dual-core and the latter single-core, although neither will have Level 3 cache.

Since Intel's quad-core processors are made up of two dual-core parts packaged together, Intel can easily vary its quad-core

2008 TIMELINE

JANUARY 2008

INTEL PENRYN FOR THE MASSES: Intel releases its Q9550, Q9450 and Q9300 quad-core CPUs running at 2.83GHz, 2.66GHz and 2.5GHz respectively, plus dual-core E8500, E8400, E8300 and E8200 running at 3.16GHz, 3GHz, 2.83GHz, and 2.66GHz respectively.

DRAFT 3 OF 802.11N: The saga of the next generation of wireless networking continues. The third draft is expected to be the final one before full ratification later in 2008.

FEBRUARY 2008

WINDOWS SERVER 2008: Microsoft launches its next generation of server operating system based on the Windows Vista core technologies.

WINDOWS VISTA SERVICE PACK 1: Apart from the updated 6.1 kernel and DirectX 10.1, the first Vista service pack will not significantly change the way Vista operates for most users.

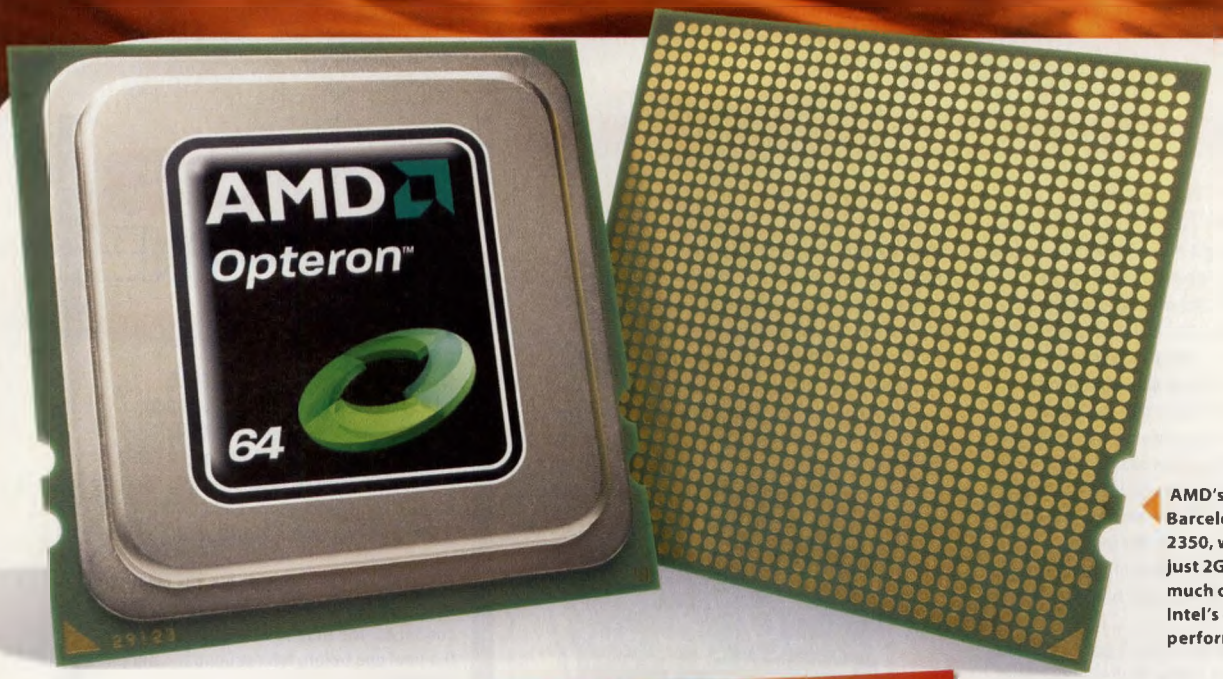
1ST QUARTER 2008

INTEL CORE 2 EXTREME QX9770: The next Penryn runs at 3.2GHz, with 1,600MHz FSB.

PHENOM 6000: The dual-core Barcelona chip, codenamed Kuma, keeps the Level 3 cache of the quad-core design.

PHENOM FX-80 SERIES: The premium FX version of Phenom for Socket AM2 will arrive, running at 2.6GHz or more.

PHENOM FX-90 SERIES: AMD's Barcelona packaged for the Quad FX platform. The FX-90 will run with a clock of at least 2.6GHz.



AMD's first taste of Barcelona, the Opteron 2350, was clocked at just 2GHz, so didn't take much of a bite out of Intel's existing performance lead.

output to meet demand. AMD's native quad-core strategy means it will have to keep its dual- and quad-core production lines separate for the time being. However, its September announcement of triple-core Phenoms has illustrated one way it can turn this disadvantage back to its favour.

The initial release of AMD's native quad-core processors hasn't yet shown that the new core design can effectively take the fight back to Intel. A large part of the reason for this has been the question of clockspeed; the first shipping versions of the quad-core Opteron (Opteron 2350) run at a maximum of 2GHz and, even though 2.5GHz engineering samples have been circulating, these aren't likely to turn the tables. But then, semiconductor clockspeed is a matter of yield, and with four cores to bear in mind, there are now an equal number of reasons why a processor will have to be clocked lower than the capability range of some of its cores.

By creating a line where it takes the hit on one core by turning it off, AMD can push overall clockspeeds higher. So expect to see triple-core Phenoms running at higher frequencies than their quad-core siblings — for less money, too. Intel already habitually ships its dual-core ranges with top models one multiplier ahead of its quad-core models, for similar yield-related reasons. Considering that only a few applications take advantage of four processing cores, even though quad-core has been around for almost a year, having higher clockspeeds will help AMD regain ground against Intel more than having the extra core.

FACT FILE!

Intel's process technology is one of its key weapons in the competition with AMD. Its ability to move to 45nm six months to a year ahead of AMD is a major strategic advantage. Not only do smaller processors require less power, you can also fit more of them on a wafer. So they cost less to produce, too.

However, this will still only go some way towards redressing the balance. AMD will be sticking with its current 65nm process until the middle of 2008, when it releases Deneb, Deneb FX and Propus using 45nm — probably only about six months before Intel moves to 32nm. The Denebs will be quad-core versions, the Propus dual-core. Regor and Sargas will replace Rana and Spica as the low-end dual-core and single-core parts without Level 3 cache. Apart from the process change, the primary enhancement here will be the move to a DDR3 memory controller and Socket AM3 platform, of which there is more later.

It won't be until 2009 when the much-vaunted AMD Fusion processors will arrive on the market, and these will initially be aimed at notebooks. Fusion is AMD's modular architecture which will allow it to mix and match components in a processor, including graphics as well as CPU cores. So 2008 will see AMD primarily consolidating and tweaking its native quad-core Barcelona, as already outlined.

SLOW MEMORY ADVANCES

FOR MAIN DESKTOP MEMORY, WE'RE WAITING FOR THE DDR3 MOVE

AMD's processors will continue to stick with DDR2 until the middle of the year, so don't expect much more than a slow switch from DDR2 to DDR3 during 2008. Although GDDR4 has been shipping on graphics cards for some time now, this is a different technology from system RAM. So with DDR4 (without the G) so far off, there are no details available for the technology whatsoever, but we'll keep you posted.

However, graphics memory technology continues to move on apace into the new year, and GDDR5 is set to arrive in products during the second half of 2008. According to JEDEC, GDDR5 will offer twice the density of GDDR4 with memory ranging from 512MB to a larger 2GB. The memory will have a new clocking structure and better error detection, as well as further structural changes to increase programmability.

PC system memory will stick to DDR3 throughout 2008, although some graphics cards are using GDDR4.

NEW WINDOWS AND SERVICE PACKS

BOTH VERSIONS OF WINDOWS HAVE SERVICE PACKS DUE IN 2008, AND THERE'S A NEW SERVER OPERATING SYSTEM PENDING TOO.

In February, Microsoft is expected to release Windows Server 2008 – the long-awaited server OS based on the technology which arrived at the end of 2006 with Windows Vista. Including DirectX 10.1, the kernel will be upgraded from 6.0 to 6.1, the same as Windows Server 2008. Kernel Patch Protection and Instant Search will be updated to make things easier for third-party developers.

Storage-related technologies including support for SD Advanced Direct Memory Access and exFAT Flash drives are being added. BitLocker Drive Encryption has been extended to include encryption of any locally created data volumes.

The defragger now means it's possible to determine which drives will be defragged automatically, but won't include the new version of Media Center improvements.

Windows XP will receive its third Service Pack in 2008, including a revamped product activation, so you won't need to provide a product key during installation.

The Network Access Protection modules and policies will filter down from Windows Vista, allowing access based on 'system health', plus the Kernel Mode Crytographic Module, for use with kernel mode drivers and services. Meanwhile, Black Hole router detection will prevent connection failure due to faulty routers.

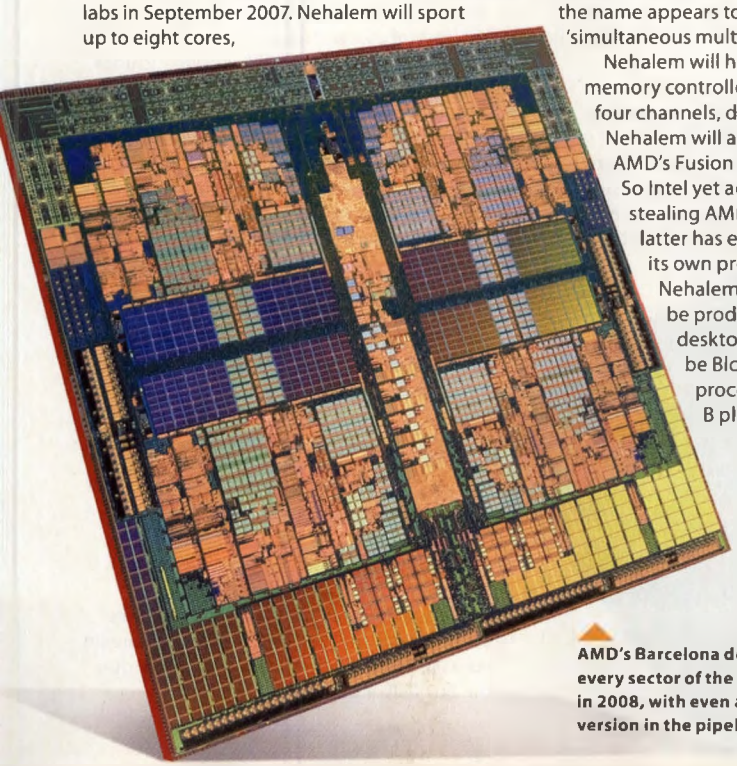
Microsoft's Office 14 Beta 1 is expected in the first half of the year, and Beta 2 in the second, with the full product in 2009. A new Windows, codenamed Vienna, is on the cards for 2009.

NEHALEM WILL ALSO GO HEAD-TO-HEAD WITH AMD'S FUSION BY INTEGRATING GRAPHICS

INTEL'S INTEGRATED MEMORY CONTROLLER

Intel will be taking its own leap ahead into native quad-core territory within the next year as well. In the second half of 2008, Intel is set to release the Nehalem microarchitecture, with wafers already coming out of development labs in September 2007. Nehalem will sport up to eight cores, each one capable of executing two threads at once. This was originally rumoured to be part of the Yorkfield and Wolfdale processors, but is being held over to the new generation. Intel's Hyper-Threading technology began as a feature in higher-end Pentium 4s and Xeons based on the Netburst architecture. On its return, the name appears to have been changed to 'simultaneous multi-threading'.

Nehalem will have an integrated DDR3 memory controller with between one and four channels, depending on the model. Nehalem will also go head-to-head with AMD's Fusion by integrating graphics. So Intel yet again looks like it will be stealing AMD's thunder before the latter has even managed to bring its own products to market. When Nehalem does arrive, it will still be produced on 45nm. The first desktop part is expected to be Bloomfield, a quad-core processor using a new Socket B platform with 1,366 pins.



AMD's Barcelona design will be wheeled out to every sector of the desktop processor market in 2008, with even a single-core Sempron version in the pipeline.

RANA AND SPICA: Athlon X2 dual-core and Sempron single-core versions of AMD's Barcelona core don't have a Level 3 cache. Clockspeeds are expected to be 2.2 and 2.4GHz.

PHENOM X3: AMD release their triple-core version of Barcelona core, which uses a quad-core processor but with one under performing core disabled.

EAGLELAKE X48: Intel's new premium chipset for enthusiasts. The major improvement over X38 is official support for 1,600MHz FSB.

NVIDIA C73: This is Nvidia's first chipset for Intel processors to offer PCI Express 2 without the usual bridge chip.

AMD 740G, 780G AND 780T CHIPSETS: Mainstream versions of AMD's 700 series chipsets, with integrated graphics and a 16x PCI Express 2 slot.

INTEL MOBILE CORE 2 EXTREME: Mobile quad-core running at 2.8GHz with an 800MHz FSB.

2ND QUARTER 2008

WINDOWS XP SP3: The first service pack for XP in four years offers over 1,000 bug fixes and patches, plus some Vista security measures.

EAGLELAKE P45 AND G45: These are mainstream consumer spins of Eaglelake that offer next-generation Intel integrated graphics and an ICH10 Southbridge for the PC.

INTEL ICH10: This marks the end of the road for PS/2 and parallel ports, but with the introduction of wireless and 10GB wired networking to make up for the loss.

INTEL CANTIGA GM AND PM: Mobile chipsets supporting DDR2-667/800 or DDR3-800/1,066, and 1,066MHz FSB speed, Enhanced Intel AMT, Turbo Memory 2, Echo Peak Wi-Fi/ WiMAX, Shirley Peak Wi-Fi and Boazman GbE. The GM version will include integrated graphics.

MS OFFICE 14 BETA 1: The inexorable arrival of yet another version of Office begins,as the first beta is rolled out to MSDN.

HARD DISK EXPANSIONS

CAPACITIES WILL CONTINUE TO EXPAND IN 2008.

Last year's arrival of perpendicular recording gave the 50-year-old hard disk yet another reprieve, with manufacturers adding technologies such as Tunnelling Magneto-Resistive heads (Western Digital), Current Perpendicular-to-the-Plane Giant Magneto-Resistive heads (Hitachi) and patterned media to further enhance data densities. But most will only arrive late in 2009.

With drive capacity increasing at around 40 per cent a year, don't expect disks to get much larger than 1.5TB this year, with Western Digital expecting to hit 3TB in 2010 and Hitachi 4TB in 2011. Although Flash memory continues to reduce in price, and companies like Super Talent (www.supertalent.com) are offering 3.5in solid state discs (SSDs) up to 128GB, cost and capacity still pale compared to mechanical hard disks. The result could be that Flash memory drives will find their way more into specialist enthusiast systems as fast boot disks, but regular hard disks will remain the norm for mainstream storage.

Flash-based hard disks will become popular in 2008, but most users will be sticking with mechanical hard disks.

CORE LOGIC UPDATES

Although AMD has been doing without a frontside bus (FSB) for years now, Intel has resolutely stuck with this traditional arrangement and looks set to continue to do so for most of 2008. The latest Penryn desktop processor uses a 1,333MHz FSB, but 1,600MHz is already rolling out with the Penryn Xeon generation at the same time, something that is likely to arrive on the desktop with the next Core 2 Extreme. However, faster processor buses need supporting chipsets.

Some are already here and available, and we can expect a slew to be arriving early this year.

The X38 chipset is Intel's current champ, but this will soon be superseded by the Eaglelake X48 chipset, which will introduce the 1,600MHz FSB. The X48 will allegedly support only DDR3, up to 1,600MHz. It will also incorporate Intel's XMP (eXtreme Memory Profile) technology to make overclocking easier. Strangely, if using 1,600MHz memory, only two DIMMs will be allowed, and only processors with a 1,066MHz or 1,600MHz FSB. Boards using X48 will offer twin x16 PCI Express 2 slots and will also sport Intel's ICH9 Southbridge.

The fast arrival of X48 is impressive and will make the X38 chipset a bit of a lame duck, quite an achievement really considering that the first examples of these boards only arrived in October.

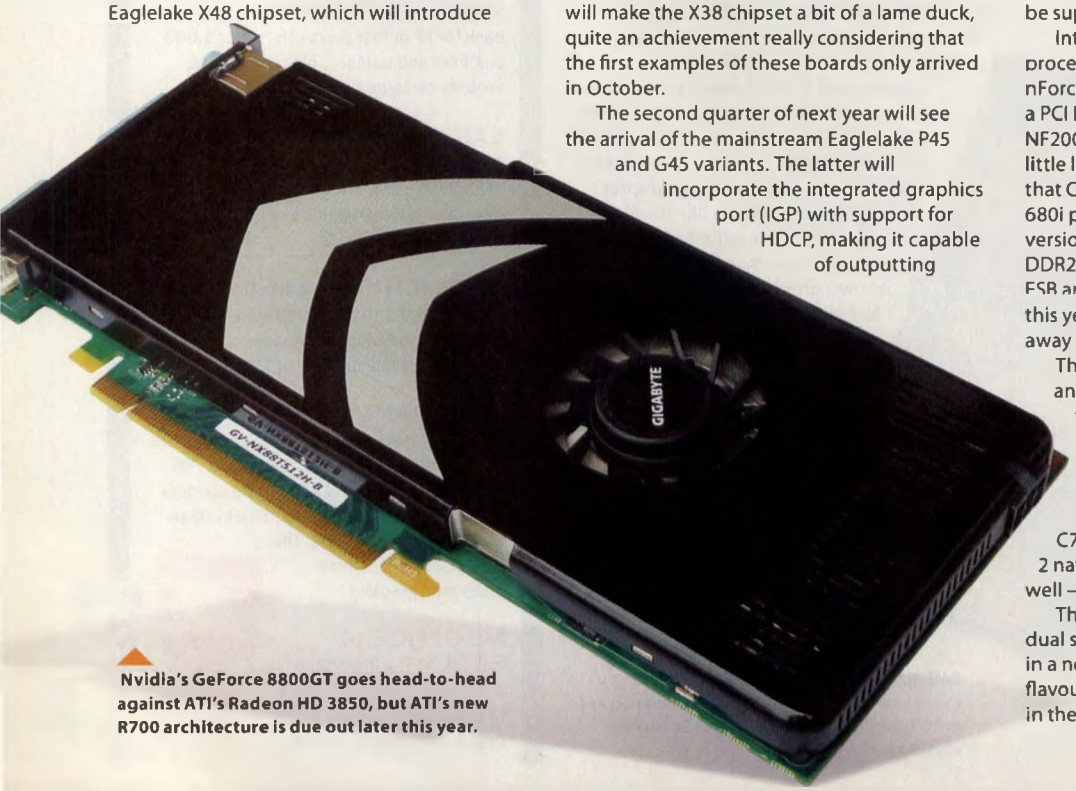
The second quarter of next year will see the arrival of the mainstream Eaglelake P45 and G45 variants. The latter will incorporate the integrated graphics port (IGP) with support for HDCP, making it capable of outputting protected content from the likes of Blu-ray and HD-DVD over a digital connection. It will also support DisplayPort connections, more of which comes later. These later Eaglelake variants will also offer the ICH10 Southbridge, which sports integrated Wi-Fi and a 10GB network controller with reduced CPU overhead and power requirements. A hardware firewall will also be built in, while ICH10 will sound the final death knell for PS/2 and LPT ports, which will no longer be supported.

INTEL ISN'T THE ONLY CHIPSET MAKER FOR ITS PROCESSORS, OF COURSE. NVIDIA HAS JUST RELEASED ITS NFORCE 700

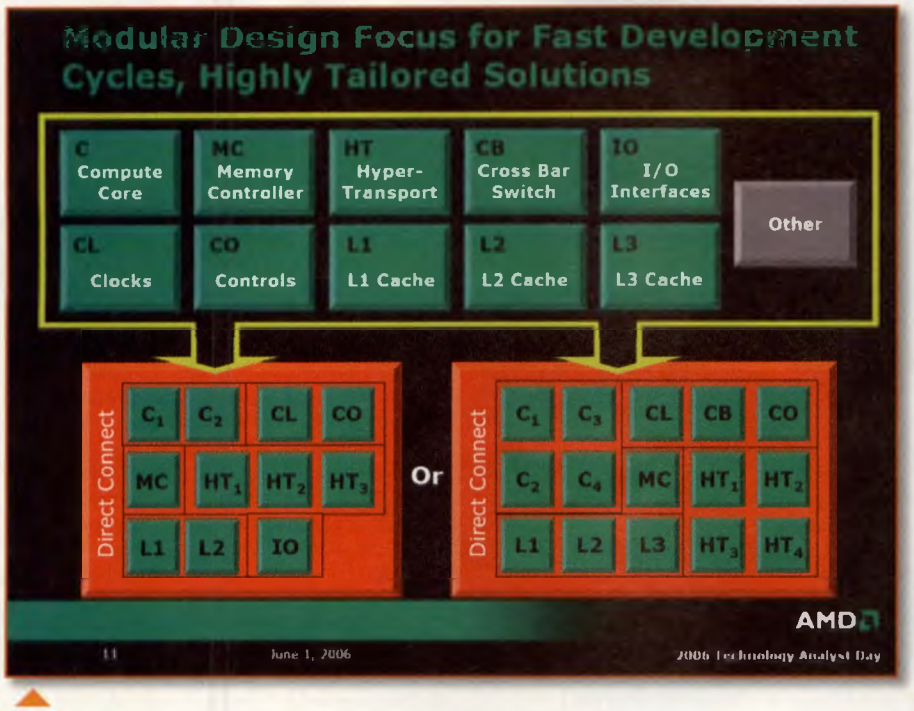
Intel isn't the only chipset maker for its processors, of course. Nvidia has just released its nForce 700 series. The first C72 version includes a PCI Express 2 bridge chip called BR04 (or NF200) to allow Triple SLI, which we'll look at a little later. The bridge has also led some to argue that C72 is not a new chipset, but just nForce 680i plus a PCI Express 2 bridge. The initial C72 version also supports only a 1,333MHz FSB and DDR2-1066, but the next C73 will offer 1,600MHz FSB and DDR3 memory when it arrives early on this year. The C73 version will also allegedly do away with the bridge chip.

The version for AMD chips is called MCP72 and naturally supports HyperTransport 3 for the new Barcelona-core Phenoms, with the BR04 providing PCI Express 2. Confusingly, AMD also has its own 700 series, which again arrived last year just in time for Christmas. Unlike Nvidia's C72, the 790FX and 790X offer PCI Express 2 natively, while drawing much less power as well — around 8W, compared to C72's 48W.

The 790FX will support both single and dual sockets, so could be the chipset of choice in a new version of Quad FX. Further mainstream flavours of AMD's 700 series chipset will be due in the first half of this year.



Nvidia's GeForce 8800GT goes head-to-head against ATI's Radeon HD 3850, but ATI's new R700 architecture is due out later this year.



AMD's new Fusion design, integrating graphics onto the processor itself, isn't due until 2009 — but Intel might get there first.

NEW CPU SOCKETS

With the 'Stars' processors, AMD introduced HyperTransport 3, and the CPUs themselves will be sticking with this bus technology throughout 2008.

The first generation of Stars will use a Socket AM2+ package, designed to be backwards-compatible with Socket AM2. The main difference between the two is support for HyperTransport 3.

AMD will stick with Socket AM2+ for most of 2008. The next-generation Socket AM3 platform isn't due until the tail end of 2008, or even the beginning of 2009. The key new addition will be support for DDR3 memory, since AMD's processors have their memory controllers built in.

Interestingly, Socket AM3-based processors will still be backwards-compatible with Socket AM2 and Socket AM2+ motherboards, implying that these processors will have memory controllers capable of supporting DDR2 as well as DDR3. Similarly, AMD has explained that Socket AM3 motherboards will be offered with DDR2 or DDR3. You won't be able to use Socket AM2 processors in Socket AM3 boards with DDR3, as they don't have DDR3 memory controllers, but they may work in a DDR2-based board.

Although AMD's 'Stars' processors are backwards-compatible with older chipsets (socket permitting), you do lose a little. For a start, while HyperTransport 3 maxes out at 5.2GT/s, the older boards will use HyperTransport 2, which will limit your processor to 2GT/s (GT = Giga-transfer for data comms over the transfer link).

Even more importantly, the new architecture uses a split power plane, allowing the memory controller and the CPU to operate at different voltages and for them to be powered up and down independently. One important benefit of this technology is lower power consumption, which you will lose if your motherboard doesn't support it.

However, without a split power plane, the memory controller will also run at a lower speed, as will the Level 3 cache, the speed of which being derived from the same clock. In practice, this probably won't make a huge difference in performance when running certain applications, although the same can't be said for memory-intensive software.

SUPERFAST BUS INTERCONNECTS

Now that HyperTransport 3 is already here, and SATA 3Gbit/s has been around for a while, most of our PC buses will remain pretty static

FACT FILE!

DirectX 10.1 will arrive with the first Windows Vista service pack in February 2008. If yours already does DirectX 10, you won't require a new graphics card, but you will need a DirectX 10.1 chip such as AMD's RV670 to allow for the new features, such as advanced anti-aliasing modes.

AMD R700: AMD's next-generation graphics moves to a multi-core architecture. Entry-level cards will have one core, mainstream cards two and high-end models up to eight.

USB 3.0: Next generation of USB arrives, promising up to 5GBit/s of bandwidth over both copper and fibre-optic cabling.

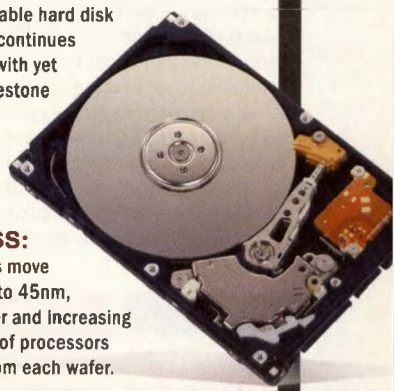
3RD QUARTER 2008

GDDR5: The next generation of graphics-specific memory begins to ship in graphics cards. Not to be confused with desktop memory, which remains at DDR3.

AMD DENEB FX, DENEB AND PROPUS: This 45nm version of Barcelona comes with a memory controller capable of supporting both DDR3 and DDR2, compatible with Socket AM2+, AM3 and 1207 platforms.

REGOR AND SARGAS: Athlon X2 introduces its dual-core and Sempron single-core versions of 45nm Barcelona respin, with a DDR2 and DDR3 memory controller, but it has no Level 3 cache. It also has Socket AM2+ and AM3 platform technology.

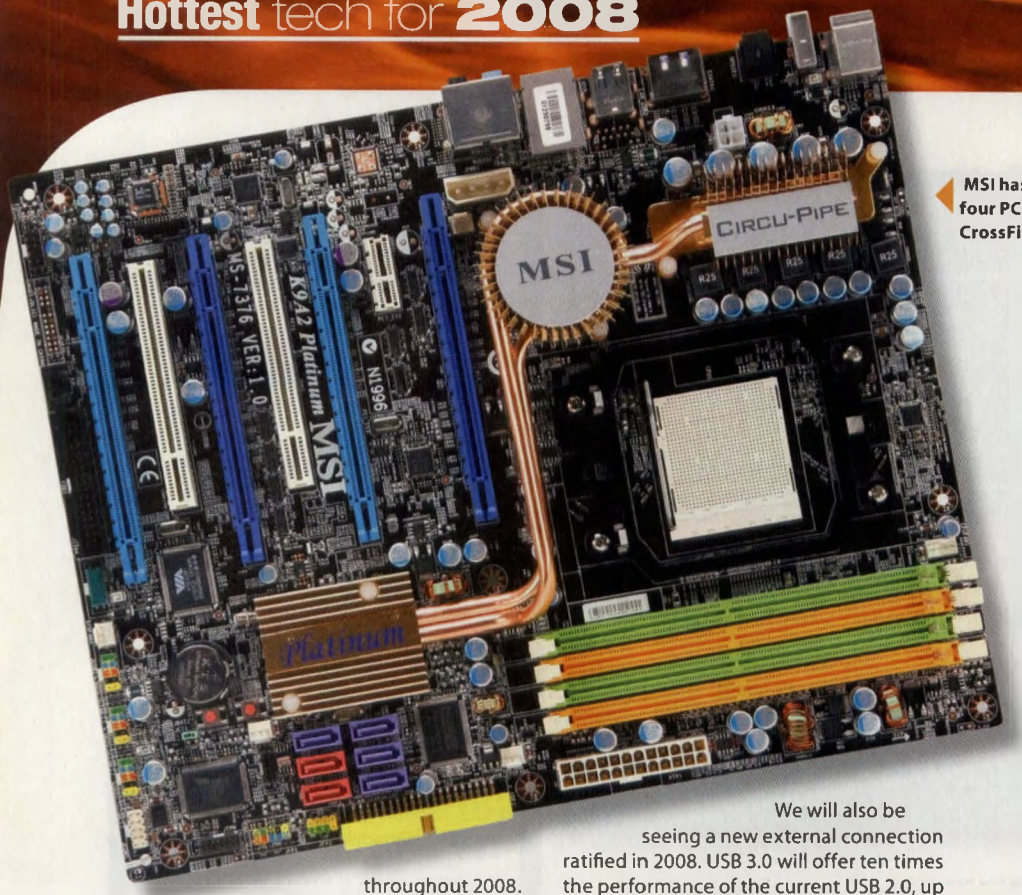
1.5TB HARD DISKS: Development of the venerable hard disk technology continues to plod on, with yet another milestone in data density.



AMD 45NM PROCESS: AMD's chips move from 65nm to 45nm, saving power and increasing the number of processors available from each wafer.

4TH QUARTER 2008

NEHALEM: First samples of Intel's next-generation architecture arrive. With up to eight cores on a single die, simultaneous multi-threading, a built-in DDR3 memory controller and potential for integrated graphics, Nehalem will be a radical leap for Intel.



MSI has already announced a motherboard with four PCI Express 16x slots, ready for Quad CrossFire when it's announced in the future.

throughout 2008.

Intel will be raising its processor FSB to 1,600MHz shortly, but there are no hints yet of faster FSBs in 2008.

However, there will be an entirely new bus on the block next year. Intel's much-anticipated Common System Interface (CSI) has now changed its name to QuickPath Interconnect (QPI) and is intended to compete with AMD's HyperTransport. Performance is expected to be 4.8-6.4GT/s, giving 12-16GB/s in each direction and 24-32GB/s for each link. QPI will initially arrive in server parts and will allegedly allow these processors to rely less heavily on Level 2 cache. The end result will be a reduction in the amount necessary, making room on the die for more cores. But QPI will also be a feature of Nehalem — making the latter even more architecturally parallel to AMD's Direct Connect.

We will also be seeing a new external connection ratified in 2008. USB 3.0 will offer ten times the performance of the current USB 2.0, up to 5Gbit/s, with fibre-optic links alongside traditional copper. An early implementation was demonstrated at the Intel Developer Forum in September last year, but the first shipping products aren't expected until late 2008 or even 2009.

ADVANCED GRAPHICS PROCESSING

With AMD releasing R600 as much as six months late, Nvidia hasn't felt the usual pressure to race its next generation out the door. Both manufacturers have just launched new parts, but they're not leaps forward in core technology, mostly die shrinks. AMD's RV670 uses 55nm instead of the 90nm, while Nvidia's G92 uses 65nm instead of 90nm. Both offer significant power savings and concomitant potential for increased clockspeeds. There are already rumours of a version of Nvidia's G92 with 128 stream processors — the 8800GT only has 112.

Looking ahead in 2008, however, this is a good thing, because it means that the more significant updates are due. Unfortunately, graphics chip vendors keep their cards closer to their chests than even processor companies. Only unconfirmed rumours circulate.

AMD is allegedly working on R700, which will take the multi-GPU approach of CrossFire to heart. Instead of producing graphics cards using one individual chip, AMD will allegedly create smaller graphics chips based on its R600 technology and bundle up to eight of them on one card using a high-speed interconnect such as HyperTransport to allow them to work together. The modular approach is also part of the Fusion design. The new technology will arrive on 55nm, then move to 45nm when AMD has perfected its process later in 2008. But beyond that, few details are known — despite R700 being due in the second quarter of this year and R800 mooted for later in the year.

The story is even murkier for Nvidia. Until a few months ago, the G90 range of chips were expected to make up the next generation of GeForce 9000 series graphics cards. But G92 has turned up as the 8800GT, and G98 is an ultra-low-priced offering which is intended to slot in beneath the GeForce 8400GS. Both are based

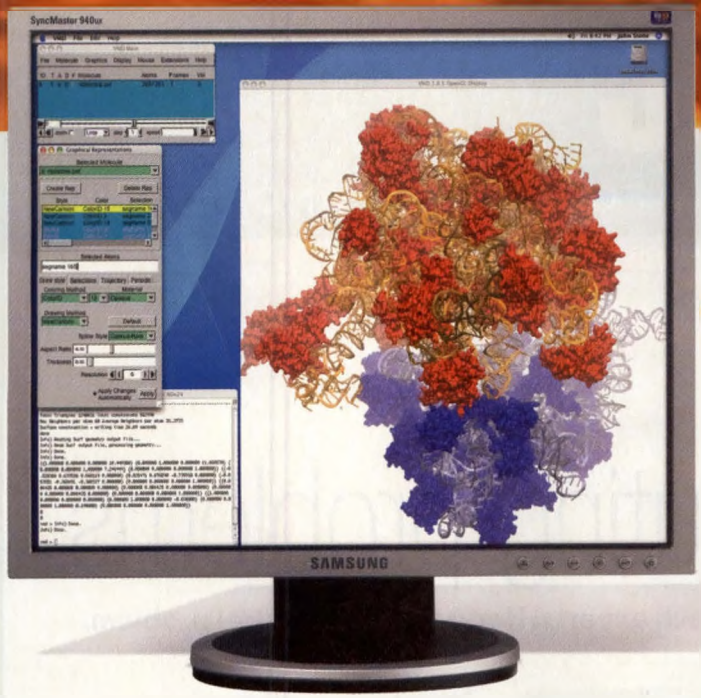
WIRELESS TO THE NTH DEGREE

THE BATTLE TO RATIFY THE 802.11N WIRELESS NETWORKING STANDARD ENDS.

Even though products claiming to be based on some part of the 802.11n specification have been on the market for many years now, the fully ratified standard still hasn't arrived. Now heading towards its third draft, 802.11n has been mired in politics and is even facing a patent dispute. However, proceedings are still expected to finally draw to a conclusion with a final draft in the first half of 2008. The final ratification of 802.11n is expected in October, but draft three should be completed by January, and the lawsuit is not expected to slow things down for the release.

So maybe this year will – finally – be the year when wireless can liberate us, put up a solid challenge and banish cabling still further into the depths of network backbone infrastructure.

Wireless networking products based on drafts of 802.11n have been on the market for years, but in 2008 the specification should be ratified at last.



USB-attached TFTs such as Samsung's SyncMaster 940UX will allow a notebook to drive an array of displays for presentations.

on the same NV50 architecture as G80.

The next Nvidia generation will be G100 or NV60. It will support Shader Model 4.1, use a 45nm production process and have as much as 1.5 billion transistors — twice as many as a quad-core Intel Penryn. It will also support CUDA 2, have 2 Tflops of processing power and incorporate Nvidia's Video Processor 3 — the next iteration of its hardware acceleration for decoding intensive video such as high-definition H.264. But G100 may not surface until 2009.

In the interim, we will see a battle between multi-card offerings. MSI recently released a motherboard with four PCI Express 2 slots, the K8A2 Platinum. This uses AMD's 790FX chipset. AMD has only officially announced a three-card version of CrossFire initially, called TriFire.

At the same time Nvidia's 700-series chipsets will offer three PCI Express slots running at 16x, for three-card SLI — although the initial C72 chipset will have only two of these slots using PCI Express 2, with the third merely supporting the original version of PCI Express.

At the beginning of 2007, plausible rumours suggested that Intel was investing in its graphics technology, with probably a high-end graphics chip on the cards. Intel is working on a project called Larrabee, which will allegedly gang ten or more cores into one die, each capable of executing up to four simultaneous threads. Although Intel will only officially discuss the GPGPU (General-Purpose computation on GPU) applications of Larrabee, it seems likely that a consumer graphics card will be one of the first products, considering how consumer graphics applications now drive professional graphics developments. Look out for samples towards the end of 2008.

One area set to change in 2008 is how we connect our graphics to our monitors. DisplayPort was ratified earlier in 2007 and has three different channels — main link, AUX and hot plug detect. The main link has one, two or four lanes running at either 1.6Gbit/s or 2.7Gbit/s, depending on the capabilities of the graphics card and display, as well as cable quality. Component bit depths can be set from 6-bit to 16-bit. In version 1.1 of DisplayPort, the AUX channel offers 1Mbit/s for command and control functions, but faster ones are being considered to carry other data such as webcam feeds, audio or USB hub connectivity. Cables can be up to 15m in length. DisplayPort is supported by AMD's RV670, Nvidia's G92 and Intel's next generation of its integrated graphics.

USB used for monitor connection will be big and useful in 2008, using a technology called DisplayLink. Samsung released its first monitor to support a USB connection, the SyncMaster 940UX, in the middle of 2007. While this will never replace DVI or DisplayPort — because 3D acceleration is not supported, at least not over USB 2.0 — it does open up some interesting possibilities. For example, since you can have as many USB monitors as USB ports, and even daisy-chain them, a multi-monitor retail display becomes a possibility using just a notebook.

Your 2008 PC will have four or even eight cores, and possibly the ability to execute 16 simultaneous threads. It could have three graphics cards, perhaps with eight GPUs in each, attached to a brand new DisplayPort monitor. Otherwise, 2008 will be a year of consolidation, with DDR3 becoming mainstream and buses like HyperTransport and SATA remaining the same. Still, with so much going on in the processor and graphics departments, 2008 is sure to be as much fun for PC enthusiasts as 2007. APC

FACT FILE!

PCI Express 2 first arrived with Intel's X38 chipset. The new version doubles the bandwidth from 2.5GT/s to 5GT/s, again using 8B/10B coding. So throughput doubles from 250MB/s per lane to 500MB/s in each direction, and a 16x slot now offers 8GB/s in each direction. But PCI Express 2 is entirely backwards compatible with the previous version.

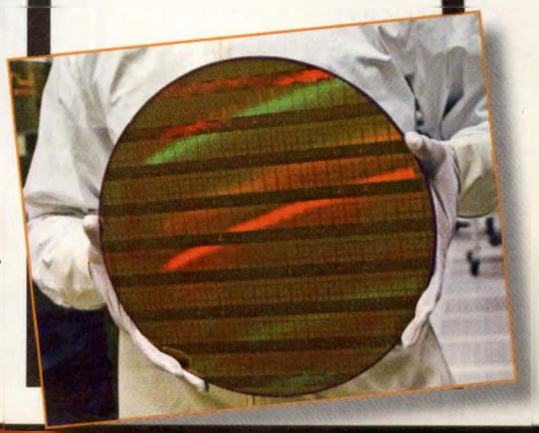
BLOOMFIELD: The first desktop version of Nehalem, using the 1366-pin Socket B platform.

802.11N: 802.11n wireless networking standard finally ratified. Official products start shipping, at last.

MS OFFICE 14 BETA 2: The second test run of Office 14 rolls out to MSDN subscribers.

NVIDIA G100: Details of Nvidia's next-generation graphics technology will begin to appear, or maybe even whole products if AMD's R700 is performing well.

INTEL 32NM: First samples of Intel's 32nm process technology start to filter through. Smaller dies, lower power consumption – and faster clockspeeds.



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HARDWARE

RECLAIM YOUR RAM

Q I seem to be forever restarting my PC to get it back up to speed. Is there a utility I can get to remove idle processes and free up wasted RAM instead of having to restart?

William Campbell

A Although there are programs available, I think your easiest option is to create your own. Yes, it's that simple. Right click on your desktop, select 'New > Shortcut' and in the input field presented type the following: "%windir%\system32\rundll32.exe advapi32.dll,ProcessIdleTasks".

This sets up the shortcut to run the program rundll32.exe from your windows directory, passing it the advapi32 DLL with the command to 'Process Idle Tasks'. Once that's typed in, click on 'Next' and give your shortcut a name such as 'Clear Idle' and click on 'Finish'.

Create Shortcut
This wizard helps you to create shortcuts to local or network programs, files, folders, computers, or Internet addresses.
Type the location of the item:
Browse...
Click Next to continue.
< Back
Next >
Cancel

Reclaim your RAM: you can create a simple shortcut to process and remove idle tasks from your memory.

Now, when you would have restarted your PC, try clicking on your new shortcut. It will run for a few seconds and you'll hear your hard disk working, but you should soon find your PC returns unused resources to you and speeds up again.

HARDWARE

CROSSOVER ETHERNET CABLE

Q I've bought a new laptop with Wi-Fi to replace an old one and I need to transfer my documents across. What's the cheapest and easiest way to do this?

Lou Stevens

A Assuming your Ethernet port still works on your old laptop, you need what's called a crossover Ethernet cable. This is like a standard Ethernet cable, except that it's configured to allow devices to connect directly to each other rather than via a router or hub. Just plug the cable into each PC, share the folders you need to transfer and copy them using normal Windows drag and drop file handling.

VISTA

AERO-DISABLING SHORTCUT

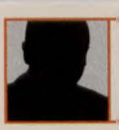
Q Some of my applications don't suit the Vista Aero Glass theme. Is there a way of quickly turning Aero on and off without going to the control panel?

Sarah Beth

A There are many applications that aren't able to use Aero Glass, and a simple tool to toggle between the default Vista theme and a less graphics intensive theme isn't available

WHAT'S WITH THE READER BOX?

APC will give readers whose answer is highlighted a small promotion box in which they can promote themselves, their business or hobby - a URL or phone number can be be included.



YOUR NAME HERE
A brief detail about how awesome you are that you could help.
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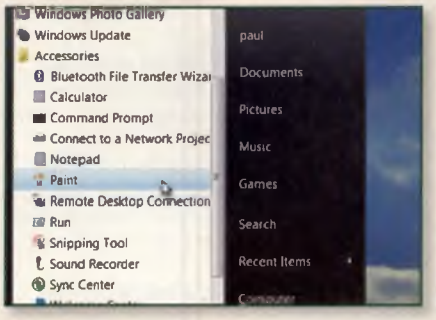
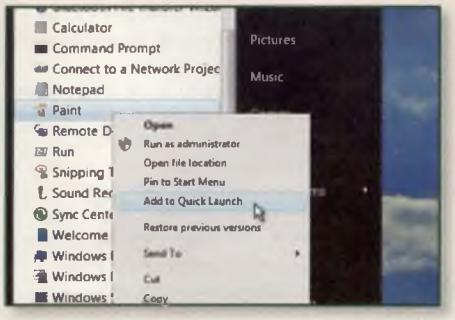
askapc@acpmagazines.com.au

TIP... **ADDING QUICK LAUNCH ICONS TO VISTA**

SIFTING THROUGH MENUS CAN BE A HASSLE, SO CONSIDER ADDING QUICKLAUNCH ICONS TO THE TASKBAR.





1 Locate icon
Sifting through Windows Vista's menus, looking for programs that you use a lot can be frustrating. However, you can make it work a lot better for you by placing your icons carefully. Instead of having them on the Start menu itself, put them on the Taskbar. Then, they are only one click away. First, find your item in the menu.

2 Take Action
Right-click on the menu item you want to install on your Taskbar and then click on 'Add to Quick Launch'. Quick Launch is a toolbar that you can add to the taskbar – it should be there with one or two programs on it already. Then, right-clicking on any program icon in the menu or Explorer should give you this option.

3 Quick launch
Your new icon is now visible in the Quick Launch toolbar. Hovering the mouse over an icon will make a tool-tip pop up with the identity of the program, just in case the icon isn't what you thought it was going to be – some can be quite difficult. Now, you can access your favourite programs in just one easy click.

from Windows Vista. Fortunately, a third-party tool for this, called Vista Aeroswitch, is available and seems to work pretty well with most graphics cards on the market. We tested it on a laptop fitted with an OEM Nvidia GeForce Go 7400. Vista Aeroswitch found the graphics card and decided that it wouldn't be compatible, but the program still installed and runs correctly. You can check out Vista Aeroswitch 2.0 from Techlogg: **http://techlogg.com/content/view/376/35**.

WINDOWS

OUTLOOK EXPRESS AND VISTA

Q Windows Mail (the Vista version of Outlook Express) does not support HTTP servers used by Hotmail (and others). Is it possible to install Outlook Express on Vista?

Les Hill

A1 The short answer to your question is no. At present there are no solutions available to either install Outlook Express on a Vista system or get Windows Mail to support HTTP servers for that matter. There are a number of enhancements being released from various sources to add Outlook Express functions to Windows Mail (like adding multiple identities etc.), but at present there is no plug-in for HTTP server support and I doubt it will come as we are now about a year into Vista. Microsoft suggests using the Live Mail service which does support this and will, like Windows Mail, download the emails to your local drive. Have a look at **http://get.live.com/wlmail/overview**.

BY SEBASTIAN SCHOLTENS
Sebastiaan has 15 yeays of IT support experience and has been running his own business for the last 5 years. He's currently starting again after a move from the NT to NSW.

A2 An alternative is to use Mozilla's Thunderbird instead. It looks and works like Outlook Express. The Windows Mail program includes all the functionality of the old Outlook Express but, crucially for some people, requires a slightly different workflow. If you can't face Windows Mail and hanker for the look and feel of the old Outlook Express, Thunderbird will import your Outlook Express email and addresses and will work with Windows Vista, so you actually can use an Outlook Express-style program within Vista.

The key to all this, of course, is to migrate the email to Thunderbird before upgrading to Vista. Otherwise Windows Mail will import your Outlook data as part of the upgrade process. Thunderbird is unable to import from Windows Mail.

Just install Thunderbird with the default options and then import your current email profile from Outlook Express. Make sure Thunderbird is the default email client, and Usenet news reader if you want it. Then reload Thunderbird and it will have your emails and addresses ready to use.

LINUX

ONE-CLICK UBUNTU

Q I'm interested in learning about Linux, but I'm always put off by the installation instructions. Is there a simple and foolproof method to install Ubuntu on a Windows PC?

Vic White

A By far the simplest installer we have come across is Wubi, the Ubuntu Linux installer at **http://wubi-installer.org**. Just click on the 'Download' link to retrieve the 10MB installer and run it. Then all you have to do is enter a username and password for your new installation and click on 'Install'. It will install Ubuntu as a file in the Windows file system (C:\wubi\disks\system.virtual.disk). This file is seen by Linux as a real hard disk.

Just wait for the 700MB ISO file to download and, after a bit of setting up, you'll be asked to reboot your PC. Afterwards, select Ubuntu as your OS and sit back and wait for the first-use installation to complete. Once done, your PC will reboot again, so choose Ubuntu again and you're in.

Now you can switch between Ubuntu and Windows each time you restart your computer. If you want to uninstall Ubuntu, you can use the Wubi Installer for that too.

LINUX

WORLD MAP CLOCK

Q I've seen a world map as a desktop background, with day and night marked on it. Is it a plug-in and where can I find it?

Daniel Boddy

A You will have been looking at a Linux distribution and the program, 'kdeworld.' It's by Matthias Hoelzer-Kleupfel and tracks the sun in real-time around the globe. This is part of KDE and therefore should already be installed. You can run this as a windowed application by selecting the KDE menu, then Games > Toys > KWorldClock. Right-clicking on the window will allow you to add times for particular places, such as London or Tokyo, for example.

Otherwise, right-click on the desktop and select 'Configure Desktop'. Next, under 'Background', click on the 'Advanced Options' button and in the 'Background Program' frame, select 'kdeworld' from the list. Click on 'OK' and when you click on 'Apply', you will see it in all of its glory.

LINUX

CHECKING LINK STATUS

Q I need to check that my web site's links are all OK. Every now and then I get some spam, offering to check my web site for me. Are there any Linux-based programs you know of that could do the job?

Mark Willock

A 'KLinkStatus' will do the job and can be found in the KDE menu at 'Development > Web Development > KLinkStatus'.

To run the program, type the full URL of your site into the address bar and click on the play button in the toolbar. There are options for checking directories recursively and, if so, to what depth. You can also tell it not to check parent directories if you've given it a URL that isn't the document root address. Perhaps, more importantly, you can instruct it not to check external links. You can also use regular expressions to specify files that you don't want to check — if you have a gallery of photographs that all contain the string 'sa403', you could use the regex '*sa403*'. Any page that throws something other than a large green tick in the status column deserves extra attention. Note that you can check more than one site at a time — just open up a new tab.

INTERNET

FIREFOX WINDOWS RESIZING PREVENTION

Q I'm an avid Firefox user but one thing drives me crazy. Every now and then a web site I visit resizes my browser window and moves it to another part of the screen. Can you explain in simple terms how I can prevent this happening?

Mike Fletcher

A It's ironic how Firefox, the more user-oriented browser, has so many useful features and yet it still enables web sites to alter its browser dimensions.

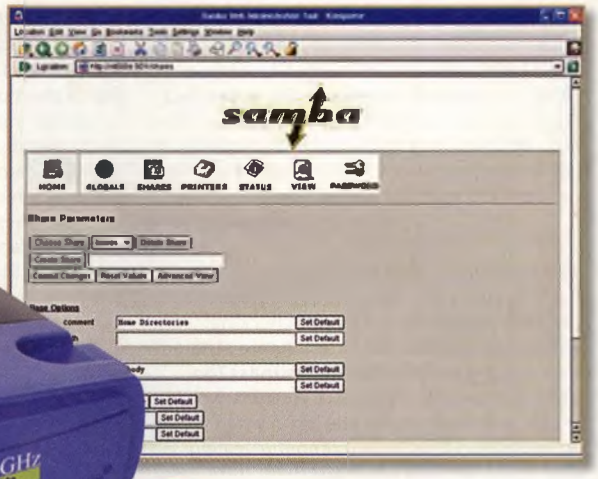
Microsoft scored a point when it stopped Windows XP Service Pack 2 Internet Explorer from enabling such behaviour by default. There is a simple way to prevent Firefox from being resized by third parties.

At the top of the Firefox browser, on the menu, choose 'Tools' and then click on 'Options'. Next go to the 'Content' tab and — to the right of 'Enable Javascript' — you'll see the 'Advanced' button. Click on that and uncheck the selection 'Move or resize existing windows'. You may also want to disable some of the other options in there, such as hiding the status bar and raising windows.

World map clock: with this as your desktop wallpaper, there's no excuse for phoning people overseas at the wrong time.

Firefox windows resizing: preventing this is easy if you dig around the menus.

One router to rule them all: how do you connect three PCs?



Vista and Samba — what's the state of the relationship?

NETWORKING

CONNECT VISTA TO SAMBA

Q I want to connect my Vista Ultimate PC to a photographic image server running Samba 2. I was successful with connecting my XP computers to this server, but I can't get Vista to accept the username and password.

Donald Haworth

A This is one case where Vista's security model exceeds XP's. The issue is the difference in the way that NTLM password encryption (hashing) is implemented on Windows XP and Vista. The option to use NTLMv2 has been part of every NT-based OS since Windows NT4 SP4. Previous versions of NT-based OSs stored and authenticated with two NTLM passwords.

In Vista, one of these passwords is turned off. It's this change that is defeating your Samba server, which is looking for both of the passwords. This change seriously increases Vista's ability to withstand 'man in the middle' password cracking attempts.

The LM hash used by Server 2000, Windows XP and the like contains several weaknesses, not least that the hashed password is conveniently translated to all upper case and then split into two weaker seven-character parts. The NTLMv2 encryption used by default in Vista is far stronger and significantly hardens Vista security.

Samba 2.x servers are unable to decrypt the NTLMv2 hash and so, if you need to use Vista with a Samba server, it's necessary to defeat this additional level of security. This is done in the following way:

1. Click 'Start > Run'.
2. In the 'Run' field type 'secpol.msc'. That will bring you to Vista's security policy system.
3. Go to 'Local Policies > Security Options'.
4. Find 'Network Security > LAN Manager' authentication level. Once there, change the setting from 'Send NTLMv2 response only' to 'Send LM & NTLM — use NTLMv2 session security if negotiated'.

If you can, upgrade your Samba server to versions 3.0.22 or 3.0.23d, which support NTLMv2. After upgrading, revert the changes to your Vista clients. Only Vista Ultimate has secpol.msc built in.

This is one of the undocumented differences between the Ultimate and the Home versions. Microsoft didn't see a need for home users to configure domain settings or adjust security policies.

NETWORKING

CORRECTLY CONFIGURE A ROUTER

Q I have a Linksys WRK54G wireless router that I want to use to connect three PCs to the internet through my service provider. How can I do this?

John Henderson

A You don't say whether you're using a DSL or cable provider, or what kind of modem you are using. To network successfully using the Linksys as a downstream router, you'll need to have a router modem that has one or more private network ports. Connect to the DSL modem using a web browser and change the private LAN IP address to any private address. Turn off DHCP for the cable modem as you will be using the Linksys to create addresses for the local network. Leave any filtering rules in place, but make a mental note to turn off filtering at the Linksys. Don't connect the Linksys router to the DSL router at this time.

Connect a PC to any of the LAN ports on the Linksys router and start a web browser. Assuming the Linksys is brand-new, you should connect to it using the default IP: http://192.168.1.1.

Configure the public LAN settings as follows: WAN (public) IP address: 192.168.1.2; Subnet Mask: 255.255.255.0; Default Gateway: 192.168.1.1.

Now configure the private LAN settings of the Linksys router as follows: LAN (private) IP address: 192.168.2.1; Subnet mask: 255.255.255.0.

Enable the local DHCP server at the Linksys using a DHCP range of 192.168.2.20 to 192.168.2.254. The default gateway for IP packets is 192.168.1.1 (the DSL router). DNS requests are resolved by your ISP, so DNS requests are routed to the DSL modem which forwards them to the IP, so the DNS address for DHCP is 192.168.1.1. Restart your router and the PC, or renew the DHCP lease (c:\ipconfig / renew). Connect the internet port of the Linksys device to one of the LAN ports of the DSL modem. On the PC, start a web browser and attempt to connect to a public web site. The Linksys is now a downstream router and IP address server. Client PCs will find the WAN using the new DHCP configuration.

SECURITY

PORTABLE PASSWORDS

Q I occasionally have to use PCs other than my own to log in to my webmail and other accounts. I'm concerned about the possibility of key-logging software capturing my details. How can I prevent this from happening?

Amanda Young

A I wouldn't recommend you use untrusted computers for logging into sensitive sites, but if you are just checking webmail, you could use the Shareware program Pass2Go at **www.roboform.com/pass2go.html**. Using a USB key to store your passwords, the program will only let you log in when the key is present and it will do so without revealing your password. This won't make you 100% safe, but it's better than leaving usernames and passwords on public computers.

PAST ISSUES

Q My computer never reboots without giving me the following message: CPU is unworkable or has been changed. Please recheck CPU Soft Menu. Press F1 to continue. ***APC* December, page 89**

A Go to the web site of your motherboard's brand and download the latest BIOS update for your motherboard. If you don't have the motherboard's support CD also download an update utility (for a Windows environment is recommended). The problem is most likely that your CPU came out after your motherboard was manufactured.

If this doesn't fix your problem (it usually does) you can go into the BIOS and disable the Error. Press F1 to continue and everything will still work fine.

BY TERRANCE HOGAN
Terrance has lots of PC games he'd like to sell, and is finding it more difficult now that there are fewer swap meets and computer trader publications.
www.service@acpmagazines.net

Q KVM switches for high-resolution monitors ***APC* December, page 89**

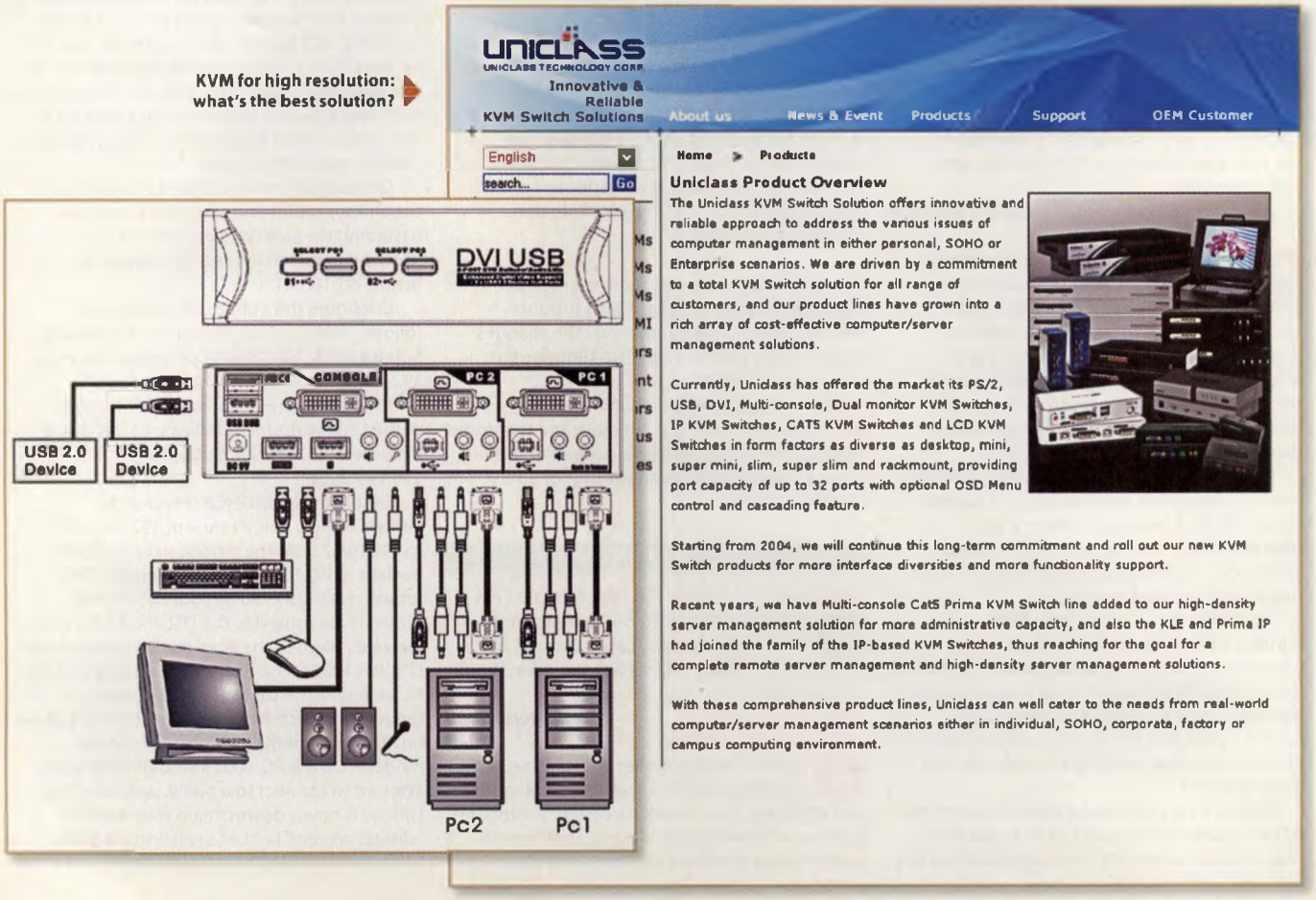
A1 The majority of lower-end KVM switches still really only support analogue signals even when they have DVI inputs. The digital signal is still very limited and it's common to see this type of resolution restriction to 1,280 x 1,024 for it.

The answer is to look at products used for higher-end DVI KVM operation. One such company is Uniclass (**www.uniclass.com.tw**); they have a wide range of DVI KVM switches but the one that is suited to what you need can be found in the Dual Monitor KVM section on their site. Model number UDV-DM02E will support resolutions up to 2,048 x 1,536 (analogue) / 1,920 x 1,200 (digital).

BY ANDREW ROSENWARNE
Andrew has been working in the IT Security industry for over 11 years and currently works at WhiteGold Solutions a specialist IT Security Distributor and Training Centre. **www.whitegold.com.au**

A2 KVM switches are interesting things. You'd think they'd just be 'dumb' switches like the old parallel printer switch, but alas, this is not the case. Most of them switch using a circuit controlled by a simple set of chips on a small print, which actually do some processing. You'll find for instance that a fair few will run off the power coming from the keyboard and mouse interface, but the picture (shadows etc.) improves considerably with an external power pack (usually not included with the cheaper ones). As these KVMs are usually designed more for the techies to be able to work on a number of

KVM for high resolution: what's the best solution?


UNICLASS
UNICLASS TECHNOLOGY CORP.
Innovative & Reliable KVM Switch Solutions
About us
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Products
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Uniclass Product Overview
The Uniclass KVM Switch Solution offers innovative and reliable approach to address the various issues of computer management in either personal, SOHO or Enterprise scenarios. We are driven by a commitment to a total KVM Switch solution for all range of customers, and our product lines have grown into a rich array of cost-effective computer/server management solutions.
Currently, Uniclass has offered the market its PS/2, USB, DVI, Multi-console, Dual monitor KVM Switches, IP KVM Switches, CAT5 KVM Switches and LCD KVM Switches in form factors as diverse as desktop, mini, super mini, slim, super slim and rackmount, providing port capacity of up to 32 ports with optional OSD Menu control and cascading feature.
Starting from 2004, we will continue this long-term commitment and roll out our new KVM Switch products for more interface diversities and more functionality support.
Recent years, we have Multi-console Cat5 Prima KVM Switch line added to our high-density server management solution for more administrative capacity, and also the KLE and Prima IP had joined the family of the IP-based KVM Switches, thus reaching for the goal for a complete remote server management and high-density server management solutions.
With these comprehensive product lines, Uniclass can well cater to the needs from real-world computer/server management scenarios either in individual, SOHO, corporate, factory or campus computing environment.
DVI USB
CONSOLE
PC 2
PC 1
USB 2.0 Device
USB 2.0 Device
Pc2
Pc1

RAM: how much can your system handle?

systems for repairs or maintenance issues, graphics is not always the main consideration. I have seen some interesting ones at JayCar and would suggest visiting their web site or store (if in your area). A quick Google search showed KVM's ranging from US$30 to US$145, with a local vendor selling a 16-port USB KVMs (UNICLASS USB-1680) for only $219. I hope that answers your question.

Sebastiaan Scholtens

Q 4GB RAM not detected — our IT section purchased several identical workstations with ASUS P5WDG2-WS Professional Motherboards with 4 x 1GB Corsair RAM and Core 2 Quad CPUs. But Windows Vista, XP (32-bit) and Linux distros only detected 2GB RAM. ***APC* December, page 82**

A In response to Jason Wright's query, I'd have to say that it's the motherboard that's doing it. Here at home, I have two Pentium 3 motherboards. Although the i810 and i815 chipsets can handle a maximum of 1GB of RAM, the motherboards limit RAM capacity to 512MB. I did try using a 512MB SD RAM module and a 256MB SD RAM module with the i815 based motherboard I have, but it wouldn't see past 512MB. I hope this is of help.

BY DAVID MOORE
David is a dedicated OS/2 lover (yes, they're still around!) who buys hardware from National Computer Converters, in Perth.

Q I have a problem with PDF files. Once I open a PDF file using Adobe Acrobat Reader 8, the computer slows down to a standstill. ***APC* December, page 89**

A1 I had the same problem with Adobe 8 hanging my computer. Bet you didn't remove Adobe 7 before you downloaded the new version? What happened to me was that whenever I opened Adobe 8, Adobe 7 stayed on my desktop and continually tried to update in the background completely hogging memory and slowly reducing my computer from a snail's pace to hanging completely. The solution is to use Windows program remover to remove both version 7 and 8, use a registry cleaner to remove all references to them, go to C:\Program Files\Adobe and remove BOTH folders for 7 and 8 and reinstall 8. Then update 8 immediately using the "Help/check for updates" function on the menu bar. I haven't found an automatic update function in 8 — it seems to be user's choice but you'll need to check for yourself on that one.

BY ALEC JONES
Alec is a consultant forensic psychologist living in Brisbane, specialising in medico-legal assessments for Victim's of Crime.

A2 I used to have the same problem. I found the issue seems to be that the Acrobat process stays running, even when you try to close it. I don't like Acrobat Reader 8's memory hogging, so I wanted an older version. I installed Acrobat Reader 5 from **www.oldversion.com/program.php?n=acrobat**.

After I downloaded that, I proceeded to uninstall Reader 8 by going to Add/Remove Programs in Control Panel, finding Adobe Acrobat Reader 8 and hitting Uninstall. Then I installed Reader 5, and no more problems! You will, however, need to click 'Do not remind me again' or similar a few times to ignore Adobe's pestering you to upgrade.

BY ROWAN LEE
Rowan is a 15 year old self-described computer nerd who is into lasers. If you ever see a beam of green (coherent) light shining into the sky around Adelaide, it's probably him. **www.blufusion.info**

Q I am worried that if one computer on my home network gets infected with a virus, it will spread to the other computers on the network. ***APC* December, page 89**

A1 Even though four systems may be connected to the same network, you have taken the right steps in installing the necessary antivirus/spyware apps on each system. As for any added risk of virus infections, most virus infections result from email attachments, peer-to-peer (often illegal) downloads and 'dodgy' web sites, which are all focused on getting the user on a particular system to personally 'allow or start' the infection.

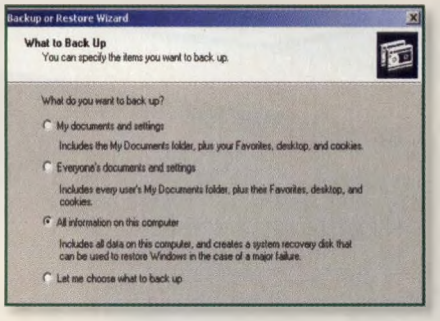
The one added risk would only be where an infected file on one computer is accessed on another system through a shared folder. However, if you keep your security software up to date, these files should be picked up upon trying to open them. So the short answer is, if always running up-to-date antivirus/spyware scanners, the added risk is negligible.

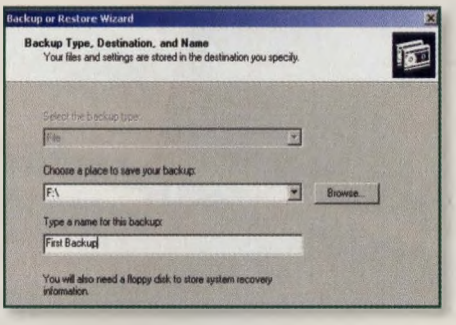
Sebastiaan Scholtens

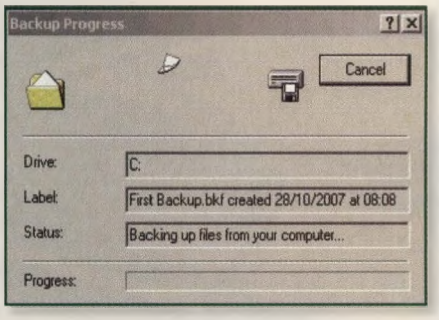
A2 The kind of viruses that spread by themselves are normally handled pretty well by the firewall built into your router (assuming you have one). However, it is possible for your computers to infect each other across your LAN. Your best bet is to keep your antivirus software up to date, and if you are very concerned, you might consider running a firewall on each individual machine: something

TIP... BACK UP DATA IN XP

SYSTEM FAILURE DOESN'T HAVE TO BE A DISASTER. USE WINDOWS BACKUP TO MAKE YOUR ESCAPE.


Backup or Restore Wizard
What to Back Up
You can specify the items you want to back up.
What do you want to back up?
My documents and settings
Includes the My Documents folder, plus your Favorites, desktop, and cookies.
Everyone's documents and settings
Includes every user's My Documents folder, plus their Favorites, desktop, and cookies.
All information on this computer
Includes all data on this computer, and creates a system recovery disk that can be used to restore Windows in the case of a major failure.
Let me choose what to back up


Backup or Restore Wizard
Backup Type, Destination, and Name
Your files and settings are stored in the destination you specify.
Select the backup type:
File
Choose a place to save your backup:
F:\
Browse...
Type a name for this backup:
First Backup
You will also need a floppy disk to store system recovery information.



1 Load it
Windows XP has a built in back-up tool that can back up your system at little or no expense. Windows XP Home and Pro come with Ntbackup, which can even perform on open files. Ntbackup can store a complete image of the system partition using the shadow copy service. Click 'Run' on the start menu and type 'ntbackup' into the dialog.

2 Back it up
Windows XP can store to either hard disk or tape backup. Tape backup is pricey but reliable and gives additional hardware compression. Vista's version allows backing up to DVD. Choose which files, or an entire system, you wish to back up. Give the backup a name, pick a destination and aim for having enough free space for multiple backups.

3 Restore it
To restore, pick the backup you wish to use, pick some or all of the files stored in backup and hit 'start'. Windows gives advanced options, including restoring the same security setting as the original files. Choose 'Always replace the file on my computer' in the Restore tab within Tools > Options, so every file is replaced with the original you backed up.

like ZoneAlarm is good (and they have a free version). If your LAN does become infected, it can be problematic to isolate the virus. In this case, you'll want to physically disconnect your machines from the network and remove the virus from the individual machines. At the end of the day, some common sense with what you download and run goes a long way in keeping your LAN virus-free.

BY JOSHUA RIESENWEBER
Joshua was brought up with computers and recently he started his own IT business, Tech-Eze (Tech-eze.com.au), doing computer repairs and networking.

NETWORKING

SHARING A CONNECTION

Q I'm creating a home network based around four PCs. One of the PCs will be the internet gateway and will connect to the others via Wi-Fi cards. Windows XP is installed on each of the computers. I'm unsure of how to configure the network and I'd like to know if there are any programs I can use which will auto-configure my network for me.

Mati Kruss

A The connection to your ISP is called the public network or public connection. This is the route from the gateway PC to the external network, normally via the public telephone system, and can be easily identified as it's the lead from the USB modem into the phone jack on the wall, rather than into the gateway computer. This side of the network is always managed by your ISP who will provide you with connection and login details to their network.

Once connected, your Gateway PC is then assigned a public IP address and becomes a node or IP host on the WAN.

The other side of the network is managed by you. This is called the private network and does not use publicly available IP addresses. Instead, the gateway PC must create and assign IP addresses which are then assigned to other machines in the private network. The XP program used to create and manage this network is called ICS or Internet Connection Sharing.

ICS is a feature of the network set-up wizard, found in 'My Network Places'. Start the network set-up wizard and choose the option best describing your situation, probably the first option in the list. ICS will examine your network connections and prompt you to choose the connection which is attached to the public network, in your case the USB modem connected to the ISP. For ICS to create a gateway, your PC must have at least one other network connection. These are then identified as the private connections. If more than one network device is found, they will be bridged to enable data to travel between them.

INTERNET

AUTOMATIC QUOTATION MARKS

Q How can I add, using a hot key, quotation marks to the start and finish of a phrase entered into Google?

Rob Knight

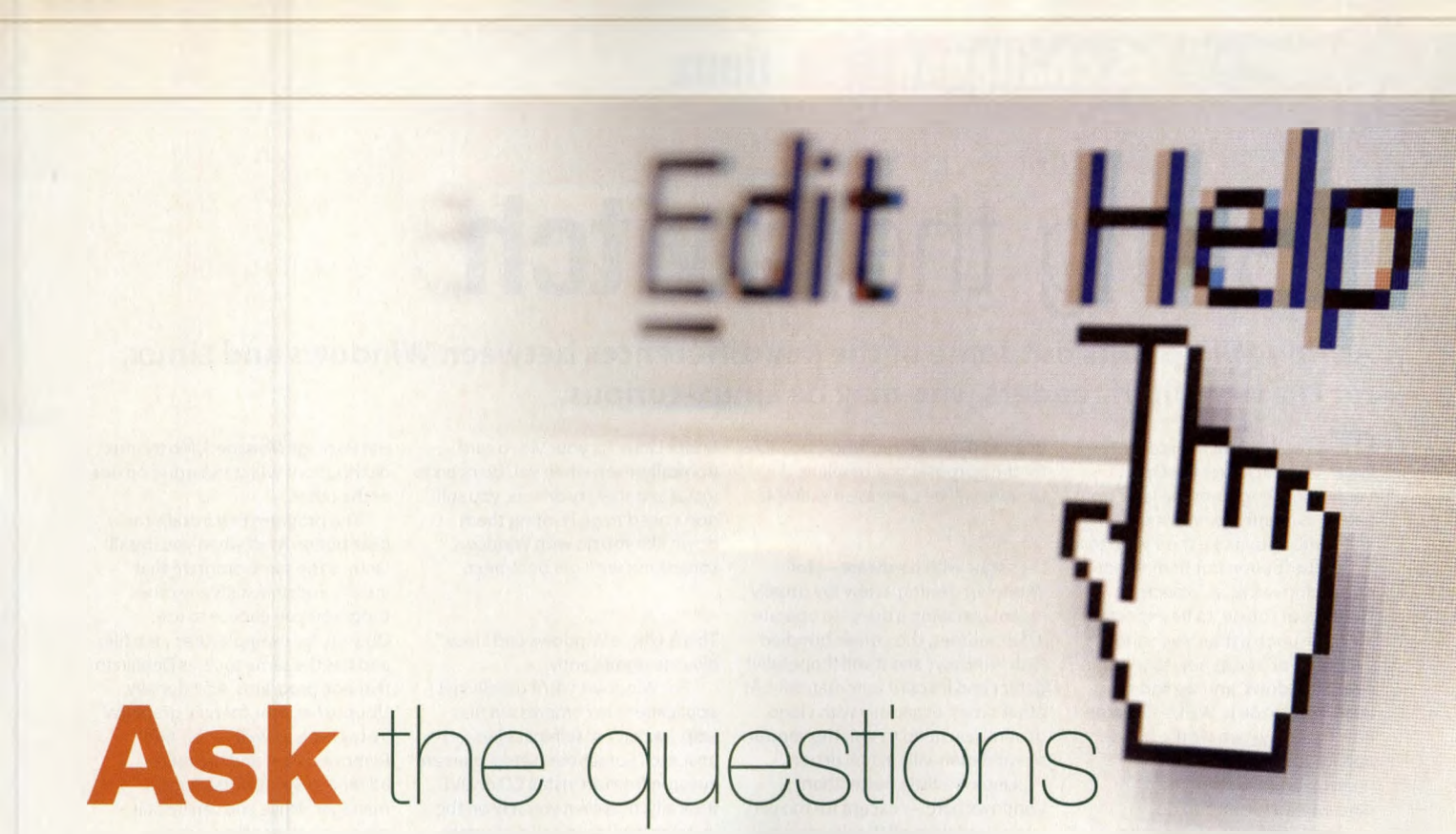
A The simplest way to achieve what you require is to use macros, which are sequences of actions you often need to use that can be very quickly activated. Now, many Windows programs come with macro support built in but Windows itself doesn't. So, to achieve cross-browser compatibility, the solution I have come up with is to download and install the Freeware program AutoHotkey from **http://autohotkey.com** — this won't take long as it's only 1.9MB in size.

Once you have installed AutoHotkey you will see a letter 'H' become active at the bottom right-hand side of your screen in your Windows Tray. Right-click on the 'H' and select 'Edit This Script'. Windows Notepad will then open up. Finally, you should type the following lines into it to take the process to the next level:

```
Send, {HOME}{SHIFTDOWN}2{SHIFTUP}{END}{SH
I FTDOWN}2{SHIFTUP}
return
```

Then save the file, right-click on the 'H' again and exit from the program and, when you restart it, your new macro will be ready to use. The new macro you have created tells AutoHotKey that every time you press the 'Windows' key and [Q] at the same time, it should send the cursor to the start of the current line and insert a quotation mark.

Then it sends the cursor to the end of the line and adds another quotation mark there — presto, everything you have typed is now quoted and you are now ready to submit your query to Google. There's a comprehensive help system built into the program, so check that out if you need more details, or see how you can easily tweak it further or even add a bunch of other macros you think will come in handy in the future.



Ask the questions

Send your technical questions, for other expert readers to answer, to askapc@acpmagazines.com.au.

Q For some reason, my Windows Explorer keeps changing the display of my files from 'Details' to 'Thumbnails' even though I go to Tools > Folder Options > View > Apply to All Folders > OK, after I have configured a folder to my likes [which includes Attributes and Comments]. Why does this happen and how do I stop it from changing my settings?

Nicolas Sampson

Q Is there a simple and inexpensive way to link 2 (or more) home networks via the internet to create one virtual network? The idea being that users on one network can see the individual network shares on the other. Another use would be to allow network-capable game consoles (like the Xbox) located on each network to connect together for system-link gaming.

Martin Ledwich
Craigieburn, Vic

Q Recently whenever I try to print any page from within Internet Explorer I get the following error. "Cannot find 'file:///C:/Users/Graham/AppData/Local/Temp/Low/MUPWE1OQ.htm'. Make sure the path or Internet address is correct."

The "MUPWE1OQ" varies depending on what page I am trying to print. When I click OK on the error message my home page immediately loads in another tab. Then after about 15 seconds another error window opens which says: "An error has occurred in the script on this page. Do you want to continue running scripts?"

I am using Windows Vista Home Premium 64-bit version and my computer has an Intel dual-core processor running at 2.4GHz with 2GB of RAM.

Graham Moyle

Q I'm having some troubles deleting files. I have quite a few files in "Deleting items" which will not delete.

Some new files will delete, others won't. I would appreciate your suggestion to solve this problem — what am I doing wrong and what do I have to do?

Aat Verhulst

Q I keep reading conflicting opinions and tips about using and not using the ASPI layer that one can download from Adaptec. Even Adaptec's web pages conflict with each other. Can I have a definitive answer as to: a) whether the ASPI layer should be installed; b) exactly the number of files that need to be installed; c) which version of drivers are meant for Windows XP Pro? What is its use and for which software?

Nicolas Sampson

Answer the questions

If you feel you can answer one of the questions above, please send the answer to askapc@acpmagazines.com.au.

APC will give any readers whose answer is published a small promotion box in which they can promote themselves or their business with a mission statement or slogan, and a URL or phone number. Try to make the answer no longer than 200 words, but less is better. If none of our readers can offer an answer to a particular question, we will turn to our list of industry experts to provide a solution for your queries.

Making the **switch**

***Ashton Mills* points out some of the key differences between Windows and Linux, for the benefit of readers who may be Linux-curious.**

We've had a lot of excellent feedback over the Open Source Challenge, not the least from people currently using Windows and wanting to make the switch to a Linux distribution but finding not everything works as expected. Which is, of course, to be expected!

Once upon a time, each and every one of us was new to this thing called Windows, and we had to learn how to use it. We've all learned how the filesystem works, how applications are installed and uninstalled, how to get new hardware to run and so on.

And for anyone making the switch to Linux, not all of these paradigms apply. Linux does of course share many similarities to Windows, but also does a few things differently. And just as you had to learn Windows once, making the switch to Linux means learning it from the ground up too.

So with that in mind, this month we'll cover some of the key differences between Windows and Linux, and how to translate your Windows experience to a (much improved) Linux one. Where possible, for the purposes of a baseline, Ubuntu will be used as an example.

DRIVERS

Let's start with hardware — for Windows, getting a new toy usually means installing a driver to operate it. Sometimes, this comes bundled with Windows and it will (hopefully) detect and install it automatically. At other times, especially with video drivers, you need to visit the vendor site and manually install drivers.

Linux is a little better than Windows here — except for the very latest hardware, all the drivers you need will come with the Linux kernel or, in the case of video drivers, bundled with X Windows (the GUI). The exception is OpenGL accelerated video drivers, which require you to install the official drivers from a vendor such as Nvidia (these drivers are 'binary' drivers and not open source, and as a result can't be distributed with the kernel). If you don't need 3D support, however, you don't need to install video drivers to get full functionality under Linux for your video card. Ironically, even when you do need to install proprietary drivers, you still don't need to go hunting them down like you do with Windows, something we'll get onto next.

APPLICATIONS

This is where Windows and Linux diverge significantly.

For Windows you'll usually get applications in compressed files (.zip, .rar, etc) or self-installers (.exe, .msi, etc). Sometimes setup .exes are autorun from an install CD or DVD. Basically, however, you rely on the installer itself to install a program and put everything in the right place. And as you've found over the years, there is a huge range of installers for Windows that all look and operate differently.

Not so with Linux. While you can still get plain old compressed files (.zip, .gzip, .tar.gz, etc) you also get *package* files which are, essentially, compressed files with extra information on how the program is to be installed — but the installer itself is not included. Instead, this is part of the OS and thus remains standard regardless of which programs you install.

There are a few package formats under Linux, but the two main ones are .deb (from Debian, a popular Linux distribution) and .rpm (Red Hat Package Manager). Most Linux distributions will standardise on one or the other.

The program that installs the distribution itself when you install Linux is the same program that installs and uninstalls any other programs you choose to use. Ubuntu, for example, uses .deb files and has the same tools as Debian to manage programs. Additionally, Ubuntu has user-friendly graphical install tools as well — the Add/Remove dialog and the more advanced Synaptic package manager. While you can install programs from other sources, Ubuntu alone has access to some 23,000 packages, so you never really need to go looking for a program.

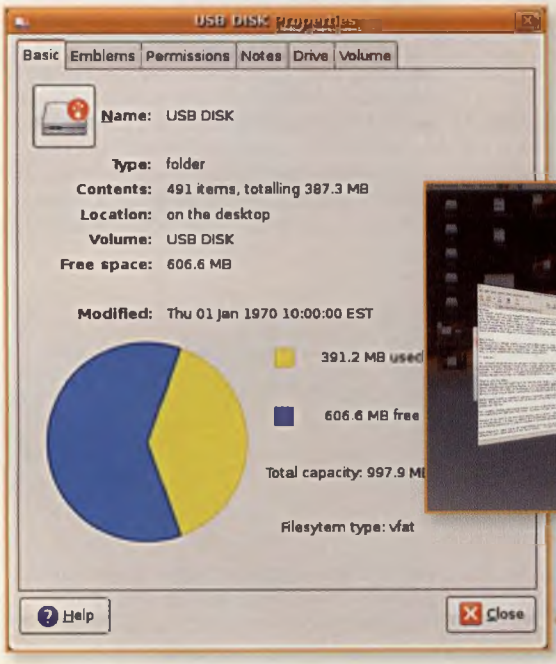
This is an important distinction — pretty much everything you'll ever need is in the software repositories, and the programs are free. You can download, install, and uninstall any of them at any time.

Even when it comes to proprietary binaries, like the Nvidia drivers, while you *can* download and install these direct from Nvidia, Ubuntu (for example) bundles these for you and they are an installable package just like everything else.

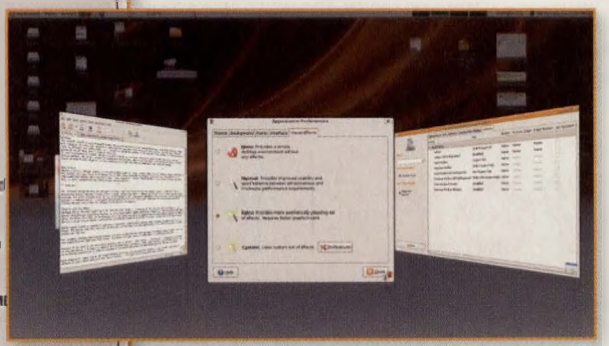
FILESYSTEM

Under the hood, Linux stores files quite differently to Windows. Filesystem aside (for which most Linux distributions default to Ext3, a journaled filesystem similar to NTFS) the biggest difference is structure — under Windows all files related to a program are usually stored in a single directory. Under Linux, specific file types have a dedicated home on the filesystem — binaries are in 'bin' directories, libraries in 'lib', configuration files in 'etc' and so on. It may sound confusing, but it means there is a standard for where files are placed and so you always know where to look.

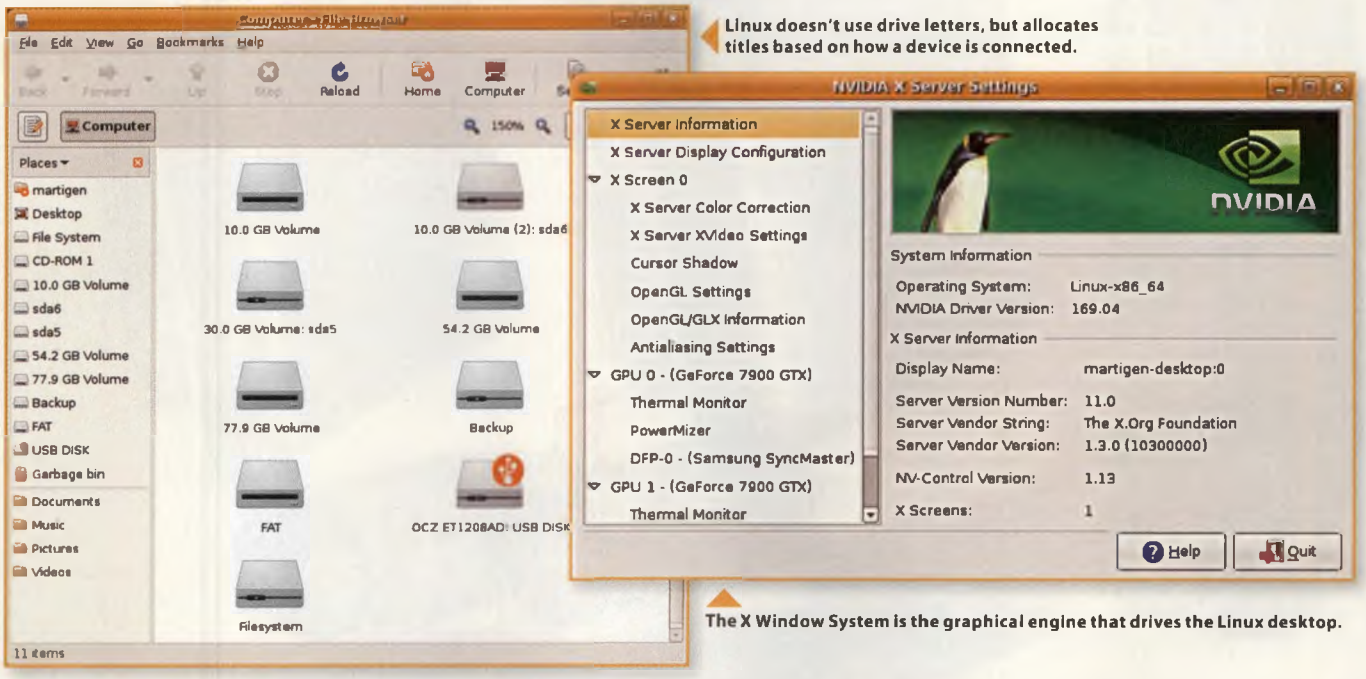
Ultimately, packages such as .deb and .rpm make all this transparent but it's handy to know



USB devices are detected and added to the desktop just like Windows.



Snazzy 3D desktops are par for the course now.



Linux doesn't use drive letters, but allocates titles based on how a device is connected.

The X Window System is the graphical engine that drives the Linux desktop.

when it comes to browsing your filesystem.

There are however two key differences you need to remember from Windows — directory slashes are / and not \, and Linux is case-sensitive. For example /home/apc is not the same as /home/APC, whereas under Windows case is irrelevant.

DRIVES

In Windows all your partitions, physical hard drives and removable media are automatically given a drive letter to help you logically separate them, and frequently these can change depending on the order devices are discovered in your system.

Linux doesn't use drive letters, and instead allocates titles based on how a device is connected to your machine. It's a logical system with large scope for expansion that we don't have room to go into here, but as a user you don't need to worry about it — most distributions will automatically detect your drives and partitions, including removable media (CD, DVD, USB keys etc.) on the fly and add icons to the desktop to access them. Recent distributions will even support writing to your Windows NTFS partitions directly from Linux.

FILE MANAGEMENT

Another paradigm you'll find that persists is file management. Under Windows Explorer it can be used to manage files, preview media, copy across devices and so on. The same is true under Linux regardless of whether you use GNOME or KDE. Under GNOME the file manager also powers desktop functions much like Explorer under Windows and is called Nautilus. Under KDE the Konqeuror browser doubles as a very powerful file manager (for example, it can encode music CDs to MP3 on the fly by simply dragging songs across from a music CD).

By default Ubuntu doesn't display a 'My Computer' on the desktop, but clicking 'Places' in the top task will show 'Computer' and works just the same as 'My Computer' under Windows. 'Network' can also be accessed from here, and again network browsing works just as you'd expect.

SECURITY SOFTWARE

An absolutely essential component of any Windows machine is security software — firewall, virus scanner, malware detection, phishing filtering and so on. These components are so important, of course, that Vista comes with its own versions.

Does Linux need these as well? Some of them — a firewall is essential for any machine connected to the internet, regardless of its operating system. Linux actually comes with everything you need to create one, and some distributions, like Fedora, will set one up for you during installation.

In terms of viruses, there are of course virus scanners for Linux but virus infections are few and far between. This is partly because Linux isn't as big a target as Windows, and partly because by design it's a more secure operating system with stronger restrictions on what a user account can access. That said, prompts for authority are less frequent and intrusive as compared to Vista, and of course XP has no protection at all. For virus scanners under Ubuntu, ClamAV can be installed from the Add/Remove dialog, and Firestarter can help setup a firewall quickly and easily.

UNDERSTANDING X

What's all this GNOME and KDE stuff? Are they just themes? Not quite — it helps to understand a little about how the Linux GUI works. The *X Window System* is the actual engine, or framework, that drives the graphics of a Linux desktop. What's displayed on screen however depends on two extra components: the window manager, and the desktop environment. GNOME and KDE are just two of many desktop environments, and encompass a consistent toolkit for the display of graphics such as buttons, drop down lists, icons and so on as well as actual applications like a file browser (Nautlius in GNOME, Konqeuror in KDE). The window manager is the application that draws and manages the borders around windows themselves, and as a result you can run a variety of different window managers — each with their own visual styles and themes — with both GNOME and KDE. The default window manager for example for GNOME is Metacity, while for KDE it's KWin. It may sound a little confusing, but it provides a measure of flexibility. Everyone has a preference, and some distributions default to GNOME (such as Ubuntu) or KDE (such as PCLinuxOS).

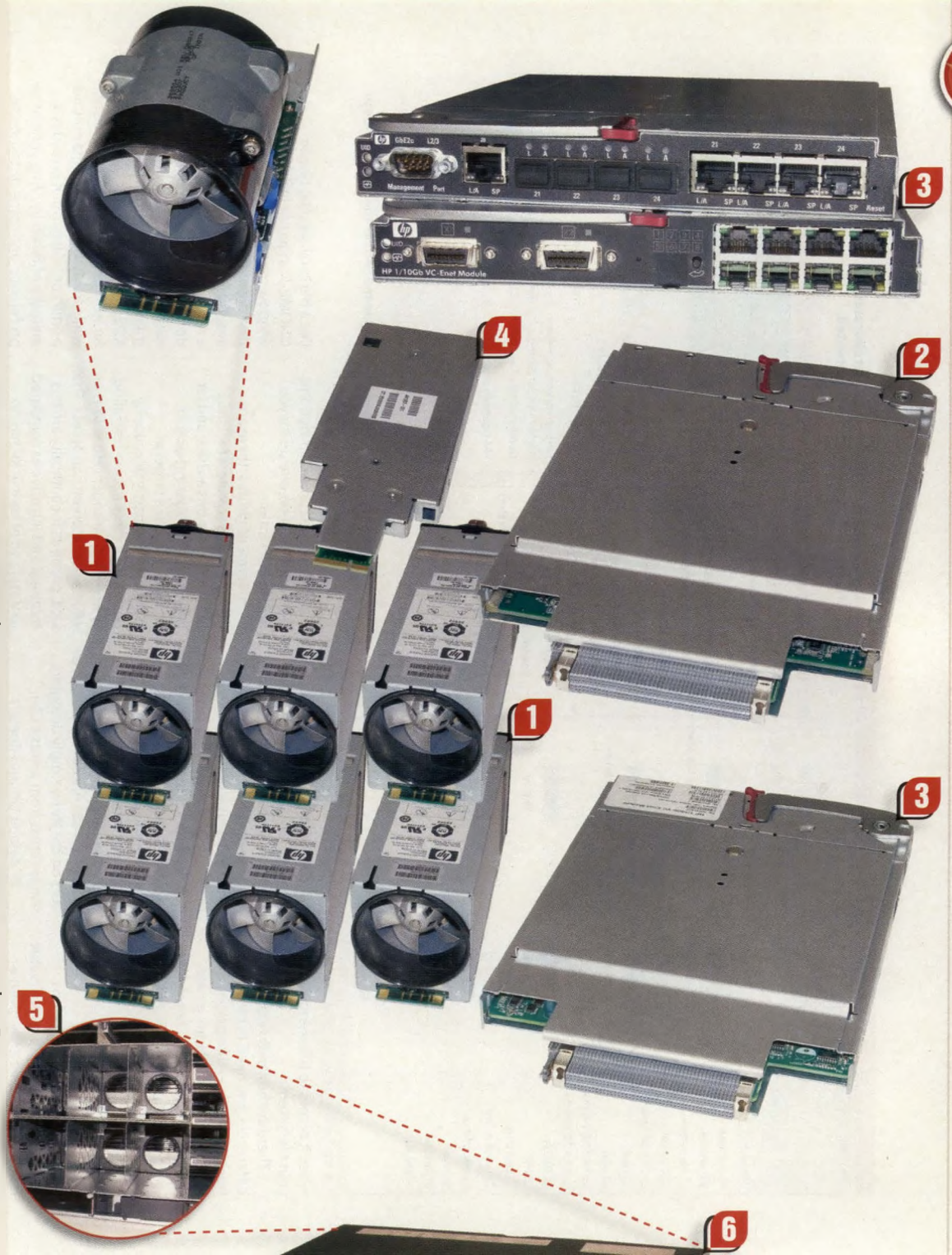
CTRL+ALT+DELETE

If you're used to hitting Ctrl+Alt+Delete under Windows to bring up Task Manager or log out, this won't work the same under Linux. Depending on the distribution, and whether it uses GNOME or KDE, Ctrl+Alt+Delete will usually bring up logout options, including hibernation, but not an option for managing running processes. Instead this can be launched directly from the GNOME and KDE system monitors which can be optionally added to the taskbars.

These are some of the key useability differences between Windows and Linux, but there are finer subtleties under the hood, which we may explore in a future instalment.

HP BladeSystem c3000 'Shorty'

We explode HP's new BladeSystem c3000 "Shorty" server. a unique all-in-one server infrastructure box for SMBs. It's really a tiny data centre which can accommodate server blades, storage and network in the one self-contained self-cooled box.



1 HP Thermal Logic 'Active Cool' fans with hotplug technology. Airflow is optimised for cooling efficiency with less air draw, leading to reduced power consumption and improved accoustic performance.

2 Ethernet Switching interconnects: HP GbE2c Ethernet Blade Switch. Provides enclosure uplink/downlink Layer 2 wire speed switching. Hotplug capability, configurable using Alteon OS, with choice of Gigabit RJ45 or SFP Fibre uplink ports. Rear view shows signal redundant path connector to passive signal midplane for reliability and availability to all Blade Servers.

3 HP 1/10Gb Virtual Connect Ethernet Module option. Virtual Connect technology virtualises the server edge I/O connections to the Ethernet (LAN) or Fibre Channel (SAN), making I/O connections change ready.

4 Remote Administration ports with multi enclosure control and hotplug technology: Enclosure Up and Downlink for rack view and control, iLO/Onboard Administrator Ports.

5 Rear view of enclosure with all fans, switch interconnects, management and power component removed. Note the vane shutters that close in fan bays to ensure efficient enclosure cooling can be redirected if the airflow is disrupted. This is part of HP's 'Parallel Redundant Scalable Enclosure Cooling (PARSEC)'. With PARSEC technology, each component within the enclosure has its own independent cooling path, therefore providing stronger cooling to components and increase in reliability.

6 Configurable BladeSystems enclosure. Six rack units high, configurable up to 8 half-height blades or 4 full-height blades. Enclosure can be configured to have a mix of Intel Xeon and Itanium Blades along side AMD, direct or shared storage blades, with PCI expansion and tape blades.

7 All Blades Servers have redundant internal high bandwidth I/O pathing with separate power keyed connectors. This design is engineered on 'H+P Non-Stop Enterprise Servers' highly available design philosphy of seperate passive signal and power midplane technology.

8 HP ProLiant BL460c Server Blade: Intel Xeon Dual Socket half height Blade Server. Configurable with either dual- or quad-core Intel CPU's, 8 DIMM slots, Hot Swap Small Form Factor hard disks with SmartArray RAID technology with option of battery backup cache, and a choice of different I/O mezzanine PCI-E cards for different I/O requirements. Internal USB port, feature-rich remote managment iLO2 processor, with dual-ported Multifunction GbE NIC (TOE, iSCSI capable) is standard.

9 Highly expandable eight PC2-5300, fully buffered DIMMs (DDR2-667) memory slots up to 64GB to address large memory needs.

10 HP BladeSystem PCI Expansion Blade, half height, dual full length and height slots. Configured and attached adjacent blade for those who require special I/O cards. Ability

exists to use legacy PCI-X cards and upgrade to PCI-E by swapping out supplied riser card. Internal power is provided for cards that require additional power.

11 HP c-Class Half Height Blade Server form factor. Quick release lever and simple reference guide sticker on top.

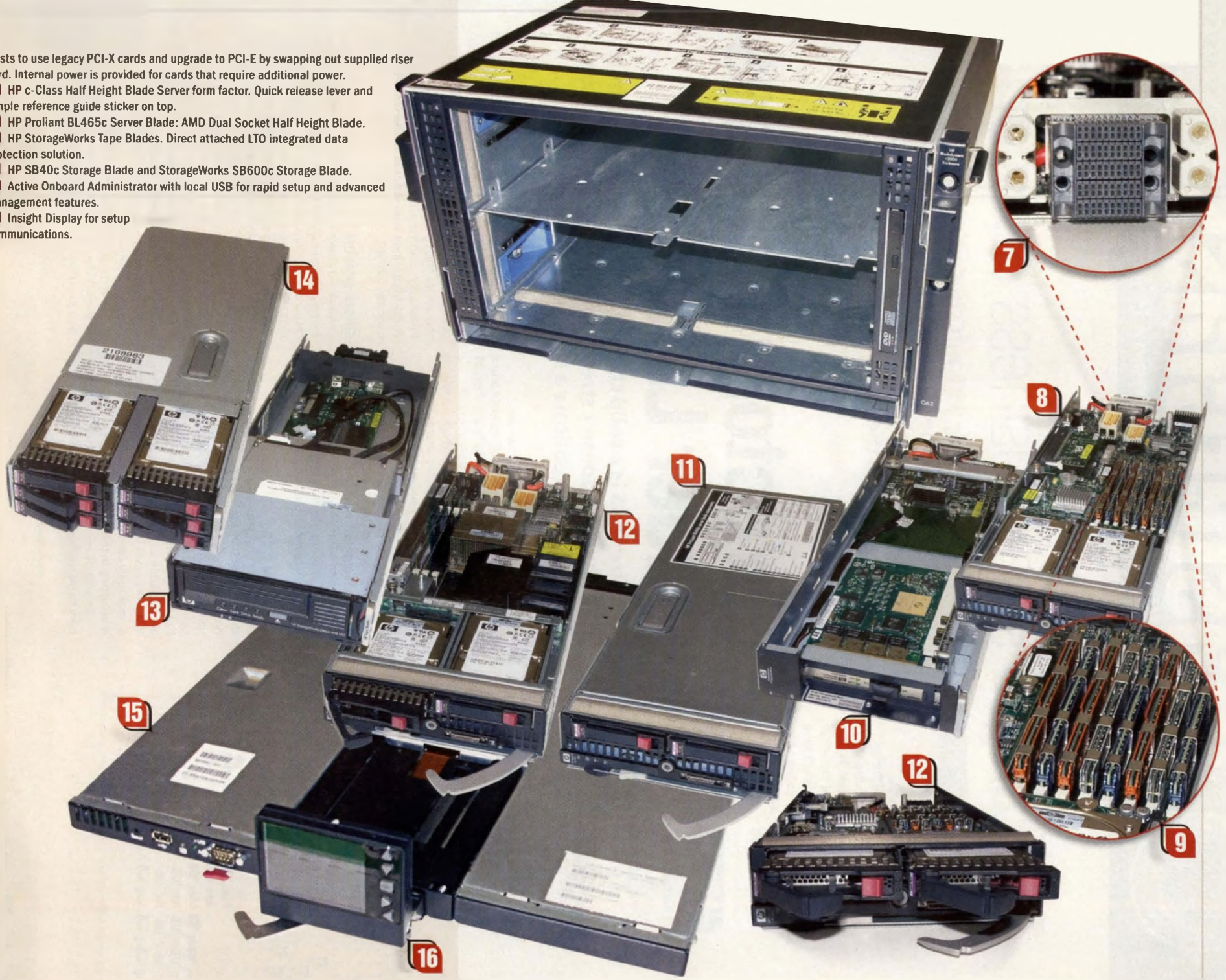
12 HP Proliant BL465c Server Blade: AMD Dual Socket Half Height Blade.

13 HP StorageWorks Tape Blades. Direct attached LTO integrated data protection solution.

14 HP SB40c Storage Blade and StorageWorks SB600c Storage Blade.

15 Active Onboard Administrator with local USB for rapid setup and advanced management features.

16 Insight Display for setup communications.



Building a small business network

WHAT'S COVERED

Overview
In this new Masterclass, Jarrod Spiga walks you through the process of setting up a small business IT infrastructure. No IT training is assumed. At the end of the Masterclass, you should know the fundamentals of setting up a server-based network to run any small business.

ABOUT YOUR TUTOR

Jarrod Spiga
Jarrod is an infrastructure architect and data centre engineer for Visionbytes, a company that provides digital video mining technologies and services to some of the world's largest media companies and many government departments worldwide. Jarrod also works as a technical consultant, assisting businesses during infrastructure installation and upgrade projects.

COURSE SCHEDULE

Sept '07 Analysis
Oct '07 Preparation
Nov '07 The Windows path, part 1
Dec '07 The Windows path, part 2
Jan '08 The Windows path, part 3
Feb '08 The Linux path, part 1
Mar '08 The Linux path, part 2
Apr '08 The Linux path, part 3
May '08 Server hardware
Jun '08 Mac in the mix
Jul '08 System management tools
Aug '08 Swing migrations

You might be handy with a PC, but what if you had to look after the back end of your business? How would you set up and manage the servers, the network and the server applications?

Part 6

Directory Services under Linux

Windows SBS is a solid choice for small companies, but if the budget doesn't stretch that far, there's no reason why you can't replicate a similar setup using Linux.

Small businesses usually have an abundance of one type of resource and a shortage of others. If your workplace is short of funds but has a relatively large number of technically proficient staff members, setting up a Linux server may be a viable alternative.

A number of pre-packaged, low-cost SBS alternatives based on Linux already exist, including ClarkConnect, SME Server and Novell Open Workgroup Suite Small Business Edition (that's a mouthful). However, for complete control with minimal cost, you can roll your own server using the multitude of packages available for your favourite Linux distribution.

CAVEAT EMPTOR

The instructions detailed in this Masterclass should apply to most if not all Linux distributions. For example's sake, this series will go through the process of configuring a CentOS 5 system as a small business server, but the applications that are used throughout are available as binaries on most distributions. If worse comes to worse though, you may have to manually compile some packages mentioned in this guide.

This guide will also assume that you know how to install the Linux distribution of your choice and that you have already done so. If you're unsure of how to do this, I would recommend that you stick with Microsoft Windows SBS, as the learning curve for rolling your own server is steep. If you wish to ignore this advice though, there are plenty of Linux installation tutorials online (or you could refer to my Mastering Linux series published in *APC* over 2005-2006).

SINGLE SIGN-ON

Centralised authentication is the key element in being able to easily lock down access to resources within your network. It is the feature that allows your users to use one set of credentials to log on to their workstations, email account, remote access web sites etc. At the heart of SBS lies the Windows Active Directory, which essentially is an object-oriented database which is accessed via the Lightweight Directory Access Protocol (LDAP). Many of the administrative tools included in an SBS installation directly modify objects within this database — either directly or through LDAP calls.

LDAP is not limited to use on Windows systems (in fact, its origins do come from Unix systems). OpenLDAP is a free and widely used

LDAP implementation designed for Linux systems. In general, once OpenLDAP has been configured with a basic database schema and a number of account objects have been added to the database, you can configure various services to provide access to users based on successful authentication with the LDAP server, as opposed to having each service use its own individual authentication database.

OpenLDAP is typically installed by default under most Linux distributions. If for some reason it is not installed, use the package maintenance application for your distro to download and install it (you'll generally need to install openldap, openldap-servers and openldap-clients binaries). If no packages are available for your distribution, you may have to resort to downloading the source code from **www.openldap.org/software/download/**.

Configuring OpenLDAP can be a daunting task, so the KISS approach (keep it simple, stupid!) should be adhered to if you're not familiar with LDAP — you're not going to easily create a schema as complex as what you see under Active Directory in any short period of time. OpenLDAP's main configuration file is located at /etc/openldap/slapd.conf. Open this file in your favourite text editor.

The first task is to change the suffix lines to properly identify your authentication realm. Search for the line:

suffix	"dc=your-domain,dc=com"

And edit it to reflect a distinguished name that reflects the fully qualified domain name organisation. Assuming that our FQDN is contoso.corp (as has been used previously in this series), the line would be changed to:

suffix	"dc=contoso,dc=corp"

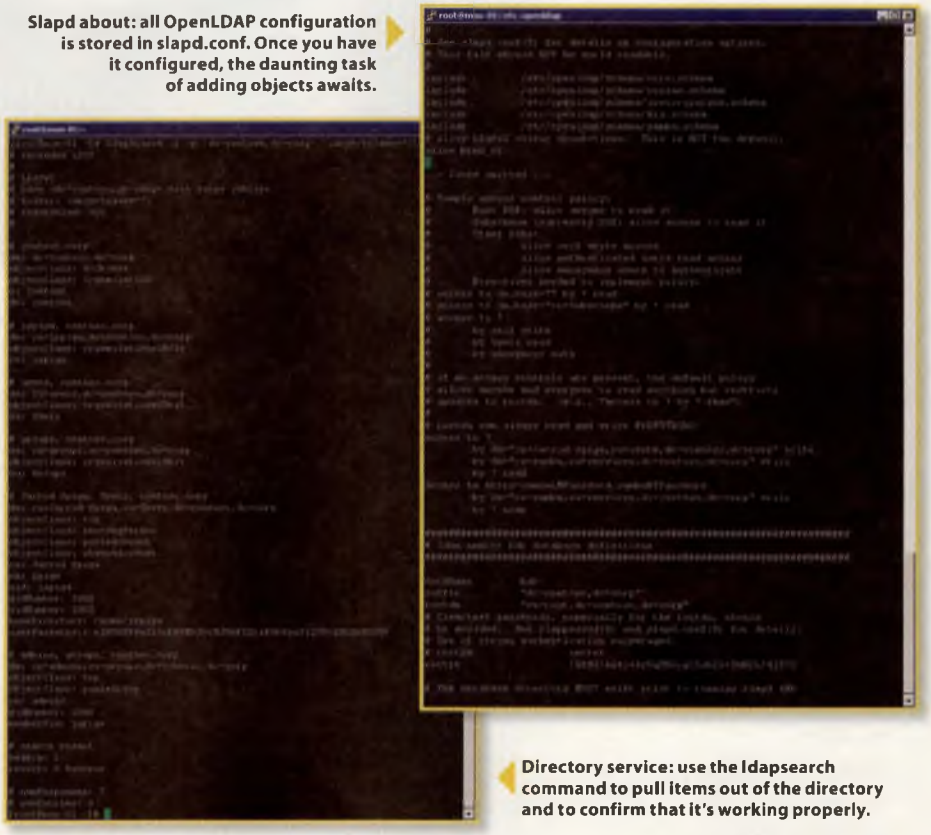
The next line (the rootdn directive) defines the distinguished name (DN) of a user who has unfettered access to the LDAP directory. You should change the line to something like:

rootdn	"cn=root,dc=contoso,dc=corp"

In order to set the password for this root user, bring up another shell and run the slappasswd command. You'll be prompted to enter your desired password and then confirm it. Upon completing these steps, a hash will be generated. Copy this line into your slapd.conf file nest to the rootpw directive as shown in the following example:

rootpw	{SSHA}+wptsprgJZMDL9dtRiCVqR26624Eu74/

Slapd about: all OpenLDAP configuration is stored in slapd.conf. Once you have it configured, the daunting task of adding objects awaits.



Directory service: use the ldapsearch command to pull items out of the directory and to confirm that it's working properly.

One important thing to remember is that unless Transport Layer Security (TLS) has been enabled, LDAP passwords (including the root DN password) are sent in plain text. Therefore, as a security measure, it's good practice to comment out the rootpw directive after you have populated your directory.

Once you've made these changes, save the configuration file and restart (or start) the ldap daemon (on Red Hat derived distros, "/sbin/service ldap restart" should do this). If you get numerous warnings such as '/var/lib/ldap/dn2id.bdb is not owned by "ldap"' when attempting to start the LDAP daemon, execute the following commands and re-attempt to start the daemon:

```
chown -R ldap:ldap /var/lib/ldap
```

These warnings can appear if the file system permissions for OpenLDAP's database back end have not been properly set upon installation. The other problem that can occur with new installations is when a default database configuration file is not present. If the DB_CONFIG file is not present under the /var/lib/ldap directory, you need to copy the DB_CONFIG.example file from /etc/openldap and rename it.

Once you've successfully started the LDAP daemon, consider configuring your system to automatically start the daemon upon booting (under Red Hat derived systems, "chkconfig --level 2345 ldap on" command).

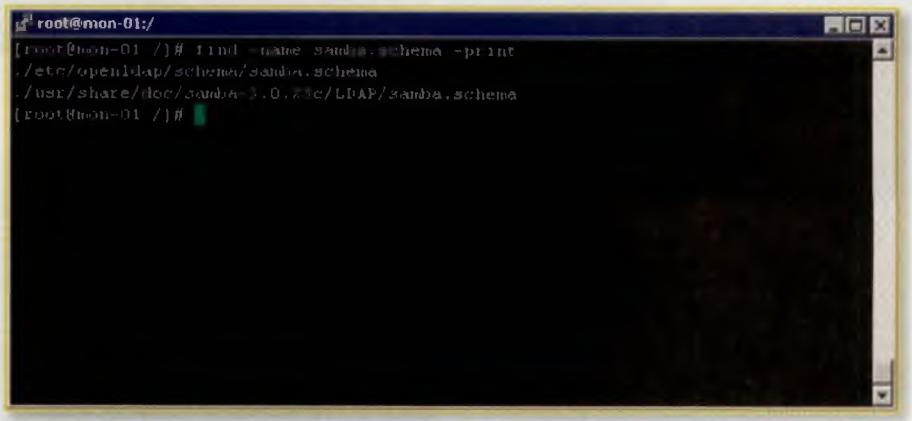
ADDING USER ACCOUNTS AND GROUPS

The ldapadd command is used to add users to the directory. Once you've authenticated with the directory, you can interactively add objects to the database — but it's generally easier to prepare a list of objects that you'd like to add in a separate text-based "ldif" file and import them in one hit.

In your favourite text editor, create a new file and add the following lines (substituting the italicised values for ones that more closely reflect your installation):

```
# Set up the organisation container
dn: dc=contoso,dc=corp
objectclass: dcObject
objectclass: organization
```

Searching for schema: if you're having trouble finding where the samba.schema file is located on your system, use the find command to do the hard work.




```
o: Contoso Limited
dc: contoso

# Set up a users container
dn: ou=users,dc=contoso,dc=corp
objectclass: organizationalUnit
ou: Users

# Set up a groups container
dn: ou=groups,dc=contoso,dc=corp
objectclass: organizationalUnit
ou: Groups

# Create a new user
dn: cn=Jarrod Spiga,ou=users,dc=contoso,
dc=corp
objectclass: top
objectclass: inetOrgPerson
objectclass: posixAccount
objectclass: shadowAccount
cn: Jarrod Spiga
sn: Spiga
# The Unix login-name for the user
uid: jspiga
gidnumber: 1000
uidnumber: 1000
homedirectory: /home/jspiga
userpassword: {SSHA}iylpTV02oprUtVWs4TmZn
bT5TfGUxGQE

# Create a new group called admins
dn: cn=admins,ou=groups,dc=contoso,dc=corp
objectclass: top
objectclass: posixGroup
cn: admins
gidnumber: 1000
memberuid: jspiga
```

The first stanza associates various objects and attributes with the "dc=contoso, dc=corp" DN, including a friendly name for the organisation (via the o: object). The second and third stanzas create organisational units (OUs, similar to those encountered in Active Directory) which will help you to organise things within the directory in a more simple fashion.

AT THIS STAGE, OUR DIRECTORY IS USELESS UNLESS WE HAVE THINGS AUTHENTICATING AGAINST IT

The fourth stanza is responsible for adding a user account to the Users OU. The important lines to configure correctly in this stanza are cn: (The canonical name or full name of the user); sn: (The surname of the user); uid: (The Linux/Unix login name for the user); gidnumber: and uidnumber: (The group id and user id numbers you wish to reserve across Linux/Unix systems for the user). Finally, the userpassword: line contains the password for this user's account. Passwords should be generated in exactly the same manner that you used to generate the rootdn password earlier.

The fifth stanza merely adds the new user to a group called admins.

Save this file as ldap.ldif in your home directory and then exit from the text editor. To import this ldif file into the directory, execute the following command:

```
ldapadd -x -D "cn=root,dc=contoso,dc=corp" -
W -f ~/ldap.ldif
```

Note the argument to the -D switch — this should be the value assigned to the rootdn directive within the slapd.conf file. After you hit enter, supply the rootdn password, and the objects should be added to the directory.

To confirm that the data has been inserted correctly, run:

```
ldapsearch -x -b 'dc=contoso,dc=corp'
'(objectclass=*)'
```

This should return a list of all objects that have been inserted into the directory for your organisation.

RESETTING PASSWORDS

If a user's password needs to be changed for some reason, the ldpasswd command can be used to reset passwords. It's important to note that end users should avoid using this command themselves unless they are familiar with the hashing mechanisms that you've set up across your workplace (so far, we've only used SSHA hashes). To reset a password, use the following command:

```
ldappasswd -D "cn=root,dc=contoso,dc=corp" -
x -W -S "cn=Jarrod Spiga,ou=users,dc=contoso,
dc=corp"
```

After entering this command, you'll be prompted to enter in the new password for the user twice and then the password for the rootdn account. If you don't enter passwords in this order, the reset process will fail.

CONFIGURING WORKSTATIONS

What we've done so far is set up the directory and added a user and a group to it. At this stage, our directory is useless unless we have the server and workstations authenticating against it. The following steps need to be configured across all workstations in your network.

Our first task is to ensure that the nss_ldap packages for your distribution are installed (Red Hat and Suse-derived distros call this package "nss_ldap", while Debian derived distributions call it "libnss-ldap"). If you cannot obtain binary packages for nss_ldap, you can download the source from **www.padl.com/OSS/nss_ldap.html**.

Next, edit the /etc/ldap.conf file and uncomment and edit the following directives:

- host: This needs to point to the IP address of the server running OpenLDAP (if you're configuring the server itself, it's safe to leave the value as 127.0.0.1).
- base: This needs to point to the base DN (eg. cn=contoso, cn=corp).
- rootbinddn: This needs to specify the DN that the system will use to bind to the directory in order to perform authentication

lookups. It can be set to the rootdn (eg. cn=root, dc=contoso, dc=corp).

- nss_base_passwd & nss_base_shadow: These directives need to refer to the OU in the directory that all of your user accounts are created under (eg. ou=users,dc=contoso, dc=corp?one).
- nss_base_groups: This should refer to the OU in the directory where your groups are created (eg. ou=groups, dc=contoso, dc=corp).

Once you've saved your changes, create a file called /etc/ldap.secret where the password for the rootdn account is and configure the permissions on the file so that *only* the root user can read it.

The following commands should do the trick:

```
echo "password" > /etc/ldap.secret
chmod 600 /etc/ldap.secret
```

Next, edit the /etc/nsswitch.conf file and make each of the passwd, shadow and group directives as follows:

passwd:	files	ldap
shadow:	files	ldap
group:	files	ldap

Save your changes and restart the nscd daemon and you should be set. When you attempt to log on to a system with this configuration, the local account database is checked first (via the files argument), and if the account is not found on the local system, the LDAP directory is then searched. Always keep the files directive before ldap — this guarantees that you'll be able to log on to the system as the local root user in the event that something goes wrong or the directory is inaccessible.

STUBBORN WINDOWS USERS

All of this is fine assuming that all of the workstations in your organisation are running Linux. But this is rarely the case — there is always someone who just refuses to use Linux and 'needs' to use their Windows system for their day-to-day tasks. In cases like this, Samba can be configured to act as a Primary Domain Controller (PDC) that authenticates against the directory service. The basic configuration of Samba itself is fairly straightforward, and we'll only be dealing with the authentication side of things in this article.

The first step is to import the LDAP schema extensions that Samba requires by copying the samba.schema file (found at /usr/share/doc/samba-<version>/LDAP/ under Red Hat-based systems or under examples/LDAP/ under the source distribution) to the /etc/openldap/schema directory.

Next, edit the/etc/openldap/slapd.conf file and add the following line towards the top of the configuration:

```
include         /etc/openldap/schema/samba.schema
```

Save and then restart the ldap daemon. Next, edit the /etc/samba/smb.conf file and change or add the following lines so that they correlate with your OpenLDAP instance:

```
passdb backend = ldapsam:ldap://127.0.0.1
ldap admin dn = uid=samba,ou=services,dc=contoso,dc=corp
ldap suffix = dc=contoso,dc=corp
ldap user suffix = ou=users
ldap group suffix = ou=groups
ldap idmap suffix = ou=idmap
ldap machine suffix = ou=computers
ldap replication sleep = 1000
ldap passwd sync = true
ldapsam:trusted = true
```

Save the changes to your Samba configuration and then create another couple of OUs within your directory in the same manner that you created OUs for your Users and Groups — one for "idmap" and the other for "computers".

A new directory account should be set up for specific use by Samba — one that has slightly elevated permissions over a regular user in order to be able to create computer objects within the directory. Pop the following text into a samba.ldif file in root's home directory and import the ldif in the same way that you did earlier, again generating the password using the slappasswd command:

```
dn: cn=samba,ou=services,dc=contoso,dc=corp
objectClass: top
objectClass: account
objectClass: posixAccount
cn: Samba Server
uid: samba
uidNumber: 3000
gidNumber: 3000
homeDirectory: /tmp
userpassword: {SSHA}iyIpTV02oprUtVWs4TmZnbT5TfGUxGQE
```

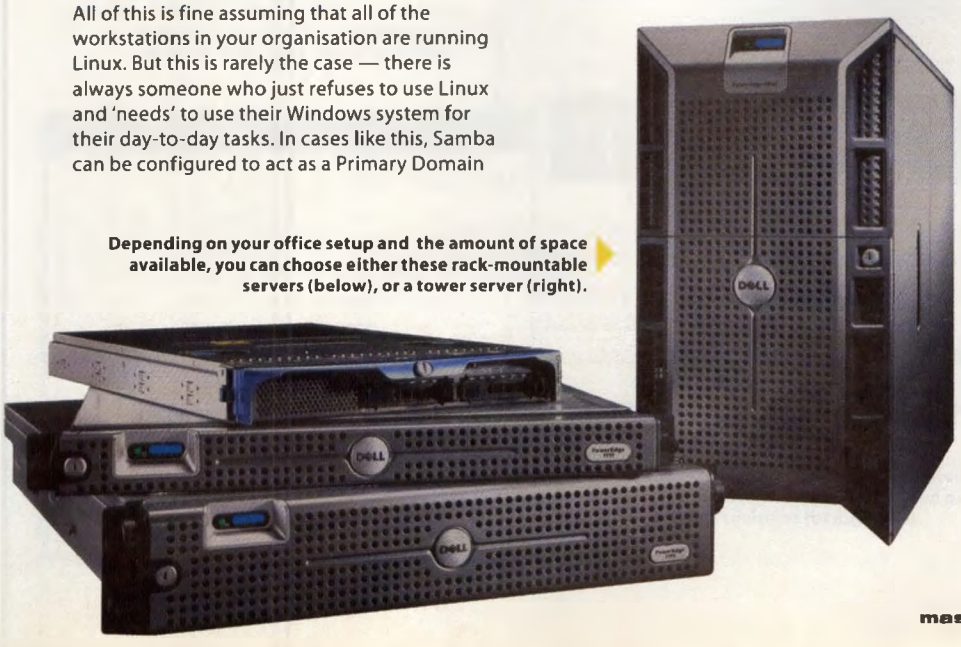
Once this account has been created, Samba needs to know what password it needs to use to bind to the directory. To do this, issue the command:

```
smbpasswd –w <password>
```

The samba account (as well as any administrator accounts) then needs to be configured with the required elevated privileges within OpenLDAP. In addition, NT password hashes should be hidden from regular users. To make both of these changes, open slapd.conf and add:

```
access to *
by dn="cn=Jarrod Spiga,ou=users,dc=contoso,dc=corp" write
by dn="cn=samba,ou=services,dc=contoso,dc=corp" write
by * read
access to attrs=sambaLMPassword,sambaNTPassword
by dn="cn=samba,ou=services,dc=contoso,dc=corp" write
by * none
```

After restarting both Samba and OpenLDAP, you should be able to use Windows Explorer to connect to any share that you have set up on your Linux server using credentials that are stored in the directory.



Depending on your office setup and the amount of space available, you can choose either these rack-mountable servers (below), or a tower server (right).

NEXT MONTH

In next month's Masterclass, the groupware features are added to the Linux server. Toward the end, you should have over 99% of the functionality of Exchange with less than 1% of the cost.

Stop Vista errors

***Mike Williams* helps you cut crashes and improve your PC's reliability with help from Vista's new diagnostic tools.**

REQUIREMENTS

- **WINDOWS VISTA**
  A PC and any version of Windows Vista are all you need to follow our troubleshooting tips.

Every regular PC user is familiar with error messages, applications that restart for no apparent reason, and everyone's favourite, the blue screen of death. However, with Windows Vista, it doesn't have to be this way.

Vista includes a completely new crash-handling system. It's much more effective than previous versions of Windows at detecting and recording what errors have occurred on your system. It also has new tools to help you diagnose and prevent those crashes. Don't put up with an unstable Vista machine: do something about it.

PROBLEMS AND SOLUTIONS

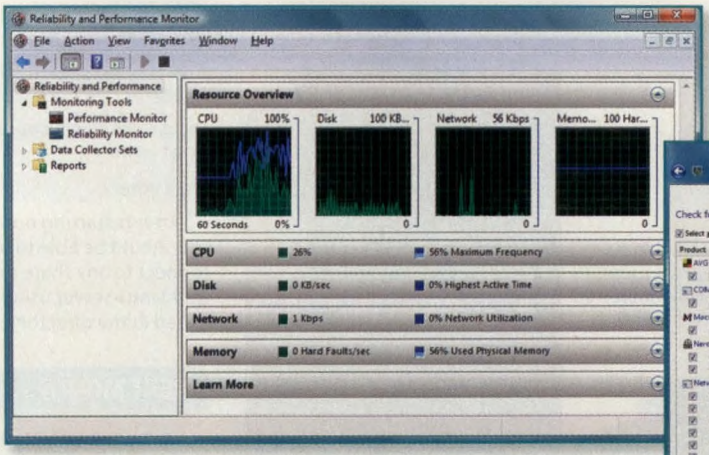
As an *APC* reader, you're almost certainly familiar with the ways of Windows. You already know how to maintain your system, diagnose common problems and get the upgrades you need. So we're going to look at the new Vista features that will help out when your usual troubleshooting tactics fail.

If you find your Vista PC misbehaving, the first place to go and look is Start > Control Panel > System and Maintenance > Problem Reports and Solutions. Vista faithfully records all application, hardware and Windows errors in a local database, and the Problem Reports and Solutions applet checks this list of problems with Microsoft to see if there are any known fixes. It may recommend an application or driver upgrade, a setting change, or something else entirely, but there's usually enough links, explanations and other data to implement the solution within minutes.

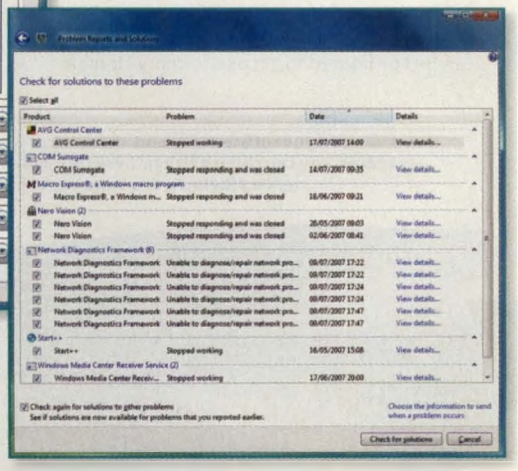
Some people aren't keen on the idea of sending any information to Microsoft though, seeing it as a privacy risk. The company says it doesn't intentionally capture any personally identifiable information. If this is untrue, or if it was found to have exploited this data in some underhand way, it would be a disaster for Microsoft, so we view any risk as insignificant. If you disagree, then clicking Change Settings then Ask me to check if a problem occurs will turn off

HANDY TIP

If you find the standard Windows Vista system information tool (msinfo32.exe) is drowning you in irrelevant information, then open a command line and run systeminfo.exe instead. You will get a much simpler, quicker report that still includes useful details from installed Windows hotfixes to your network configuration and IP addresses.



Windows Vista's diagnostic tools are a lot more comprehensive and easy to use than those found in previous versions of Windows.



Windows Vista keeps a record of your crashes, and can help you diagnose what caused the crashes and check for solutions to prevent them.

the automatic reporting. Fortunately, there are still plenty of other diagnostic tricks you can try.

RELIABILITY MONITOR

The Problem Reports and Solutions page provides a very basic list of recent errors, but click Start, launch Perfmon then click Reliability Monitor, and you'll find the System Stability Chart presents a much clearer picture.

While before you relied on memory and vague impressions from users, now this line graph can, for example, show you that 10 days ago errors increased by 55 per cent. And as the Reliability Monitor also records when software was installed or removed, it might immediately point you to a likely culprit.

Even if you're not that lucky, and only discover something odd like your system crashes far more on Wednesdays, this could still be a useful clue. What is it about Wednesdays? Is the PC running for longer, used by different people or launching particular software? Any pattern you spot might lead you to the underlying cause of your problems.

If the System Stability Chart doesn't provide any useful information, you can always ask Windows Vista to check for potential problem areas. Still in the Reliability and Performance Monitor, expand Data Collector Sets > System, right-click System Diagnostics and then click Start. A green Go icon will appear for around a minute, changing to an hourglass for a little longer. Once this has disappeared, expand Reports > System > System Diagnostics and click on the highest-numbered report.

The most useful details tend to appear right at the top. If Vista detects significant configuration problems, faulty drivers and so on, it'll tell you in an Error box. Read this and follow any links to see how to resolve these issues.

Scroll down the list to get a quick overview of your system services, hardware settings, resource use and more. They each have a green (passed) or red (failed) indicator and you can expand any failed sections to discover the cause.

EVENT VIEWER

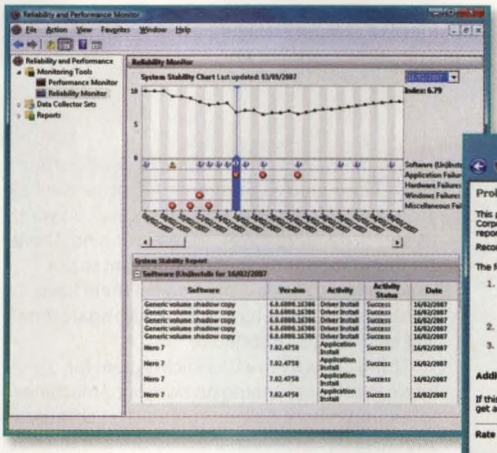
The Event Viewer records just about every error, crash, problem and issue that's arisen. Launch Eventvwr and you'll see the handy Summary of Administrative Events. It's well worth browsing through at least the Critical, Error and Warning summaries, as they'll often include problems and issues that aren't reported in any other way. For example, these may then point to service configuration issues that are responsible for the more visible errors in your system.

You'll find most of the other new features in the Actions pane. If your system is reporting an NTFS error, select View all instances of this event to see how often it's happenign. Click Create Custom View to make sure you see only the errors you want, or select Connect to Another Computer to look at the event logs on a PC in your network.

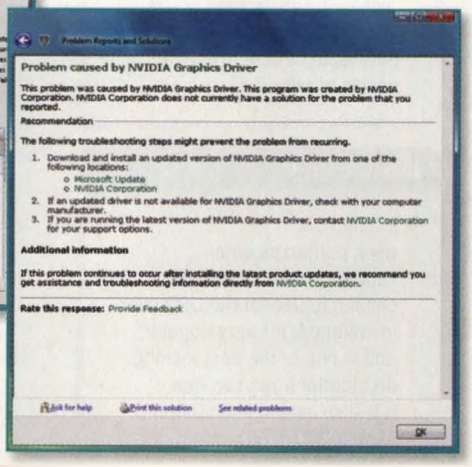
MEMORY CHECKS

Faulty RAM can be responsible for a number of odd Windows and application issues, but at least now the Vista Memory Diagnostic tool is available to help you discover the cause. Click Start and enter Memory in the Search box to launch it, then allow your system to be restarted. Once it boots into the diagnostic tool, press F1 to see the options. By default this only runs the standard set of tests a couple of times, and that's not enough to be sure of catching any errors. Choose the Extended tests instead, then select 0 as the Pass Count to keep it running forever, and let the tests repeat overnight. If faulty RAM is what is behind your PC stability problems, this should reveal it.

If this doesn't help, you could always try the final step in every troubleshooting journey: consulting Windows Help. You've probably ignored this for years, but Vista has introduced several useful troubleshooters that make the documentation really worth another look. Click Start > Help and Support > Troubleshooting to find out for yourself.



The Reliability Monitor provides a clear record of the stability of your PC and may offer you clues to the cause of any crashes.


Problem caused by NVIDIA Graphics Driver
This problem was caused by NVIDIA Graphics Driver. This program was created by NVIDIA Corporation. NVIDIA Corporation does not currently have a solution for the problem that you reported.
Recommendation
The following troubleshooting steps might prevent the problem from recurring.
1. Download and install an updated version of NVIDIA Graphics Driver from one of the following locations:
Microsoft Update
NVIDIA Corporation
2. If an updated driver is not available for NVIDIA Graphics Driver, check with your computer manufacturer.
3. If you are running the latest version of NVIDIA Graphics Driver, contact NVIDIA Corporation for your support options.
Additional information
If this problem continues to occur after installing the latest product updates, we recommend you get assistance and troubleshooting information directly from NVIDIA Corporation.
Rate this response: Provide Feedback
OK

A Vista crash solution explains how you might be able to avoid the same problem again.

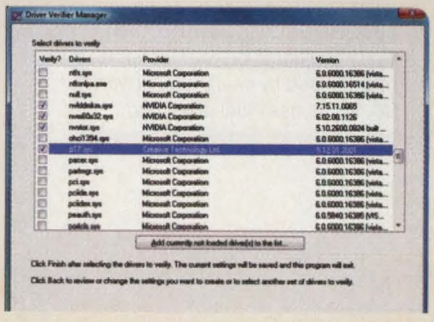
DO THIS... CHECK YOUR DRIVERS

Are poorly written drivers causing your Windows Vista machine problems? Verifier.exe provides you with a quick and easy way to help you find out. Start by confirming you can boot your Vista PC into Safe Mode (press F8 when it loads, then choose an option from the list). You'll need that later.

Next, boot your PC normally and launch Verifier.exe. Select Create standard settings, click Next, choose Automatically select all drivers installed on this computer and click Finish.

Restart your system and Verifier steps in, stress-testing every driver. If it detects a problem, then make a note of the driver name – this is the one you'll need to replace. That problem will also crash the PC, though, so reboot into Safe Mode, launch Verifier and select Delete Existing Settings to regain control.

If Verifier doesn't spot a problem, though, you'll see no messages at all. Try rebooting once or twice more, then use the Delete Existing Settings option to remove it.



Verifier.exe is a useful Vista tool that lets you detect driver problems.

Run a full OS from a USB

Linux on a USB stick means you can boot into your own environment from any PC you choose. *Graham Morrison* shows you how.

REQUIREMENTS

- **A USB STICK**
  You'll want a stick with at least a 1GB capacity – space for a Live CD and personal storage. USB 2.0 devices are also much quicker to boot and use.
- **A MODERN PC**
  Booting Linux off a USB stick is dependent on the system BIOS allowing you to do so. Most modern PCs will.
- **PCLINUXOS ON CD**
  This is the Live Linux distribution you're going to plunder for your own USB installation.
- **AN INTERNET CONNECTION**
  Just for the installation, you're going to need access to the internet to be able to grab a couple of extra files.

INSIDE INFO

- PCLinuxOS
  www.pclinuxos.com
  This is the distribution we've chosen to use for the USB stick installation. It's very popular, and is one of the best looking distributions you can use. It is also available on the *APC* August 2007 DVD.
- SysLinux:
  http://syslinux.zytor.com
  If you fancy creating your own bootable Linux distribution, then SysLinux should be your first port of call. Used by nearly every Live CD, it's an essential download.

Installing Linux onto a USB stick lets you use your own operating system, editable files and account settings on any machine you happen to be near.

We know what you're thinking. Isn't putting Linux onto a USB stick just another exercise in geek machismo, akin to putting Linux on your toaster or hairdryer? Well, the answer is no. There are many reasons why you might want to put Linux onto a USB stick, and none of them have anything to do with having too much spare time and an inadequate social life.

Using Linux from a USB stick is great for internet cafes or running on borrowed machines, for example. Booting Linux off a USB stick means your data doesn't touch the hard drive or the PC's configuration. Your Linux installation is perfectly isolated to the USB stick unless you choose to mount the hard drive partitions. Not only will this leave the host PC untouched, it also means there's no security risk because you don't leave any trace of your use on the PC — cookies, browsing cache and passwords are all safely stored on the USB stick rather than the hard drive.

You might think that a Live CD suits this purpose, and is easier to use, but there are two big problems with a Live CD that a USB stick addresses. The first is speed — a Live CD needs to read everything from the optical drive and this can make the simplest tasks feel slow. For example, if you want to launch **http://OpenOffice.org** you're in for a long wait. The second problem with a Live CD is that there's nothing to write to — no permanent storage to save your files to unless you use a local disk. A USB stick solves both of these problems in a stroke.

HANDY TIP

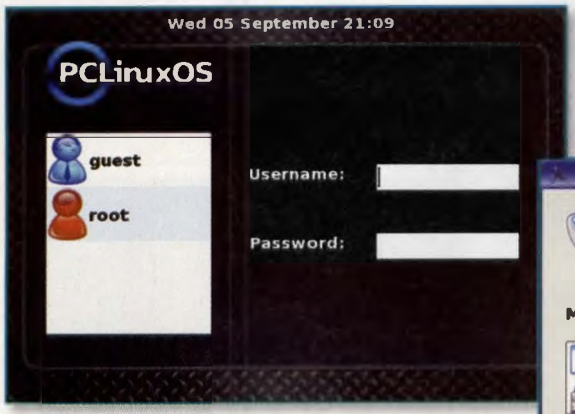
You can install most Linux Live CDs onto a local hard drive and the distribution will be transformed into a fully-fledged Linux installation. This is how many Linux distributions like to install themselves these days, and it means you can still use the installation disc after you've installed Linux onto your computer. For example, this is how Ubuntu works and PCLinuxOS can be installed in the same way, but you might run into problems if your system can't boot the Live CD and you'll need to use an alternative.

This means you can spend time configuring software, changing the look and feel of your desktop, as well as adding email accounts without losing your settings when you reboot.

IT'S EASY TO DO

Don't worry, it's not that hard to create your own Linux installation on a USB stick, but it does depend on you finding the right tools for your chosen distribution. You can't simply put your favourite Linux distribution straight onto your USB device. It might seem you could simply choose the USB device as the destination drive as you install a distribution, but this would limit its use to that PC's configuration.

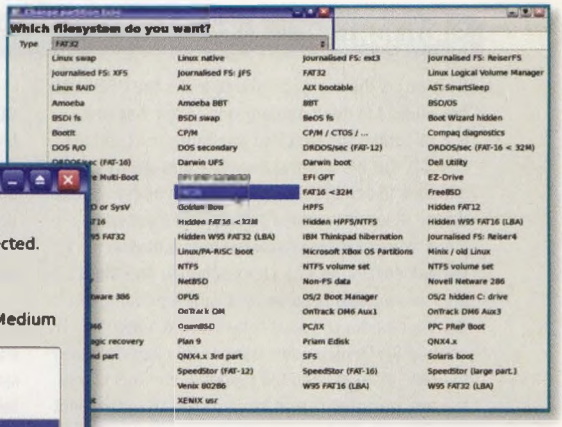
Linux located on a USB stick needs to be device independent. Fortunately, Live



The first step is to download and burn the PCLinuxOS image and boot into the Live Linux distribution.

When you first insert your USB stick, ignore the options presented by Linux and click on Cancel.

1.0G Removable Media - KDE D
A new medium has been detected.
What do you want to do?
Medium type: Unmounted Removable Medium
Open in New Window
digiKam Mount and Download
Do Nothing
Always do this for this type of media



For the root file system to boot correctly, it should be formatted as FAT16. This is available in advanced mode, although SysLinux can support FAT32.

CD distributions have already solved this problem: they run a series of auto-probing hardware configuration tools as the system is booting off the disk, and this is exactly what you want for your project.

The easiest thing to do is simply steal this configuration from your favourite Live CD. Recognising this, most Live CD distributions will provide the tools you need to create your own installation on a USB stick.

It's possible to use most Live CD distributions in this way. Knoppix is particularly popular, and you might think Ubuntu would make a good candidate, but there's a problem with the two latest Ubuntu releases that breaks USB compatibility. It's possible to get it to work, but it's a bit of a hack. Similarly, it's also possible to force most Linux distributions onto a USB stick, but if there's no Live version available, you'll need to be prepared for some heavy configuration headaches.

We've opted to go for the easy option: a Live CD distribution called PCLinuxOS. Listed as the second most popular distribution on **www.distrowatch.com**, it's a fantastic fusion of Mandriva and Ubuntu tools combined with its own unique design and style.

BOOT THE LINUX CD

After you've got hold of the PCLinuxOS (and burned the ISO to CD if you downloaded it), you need to boot your machine with the disc in the drive. If you haven't used a Live Linux CD before, you may need to either use the BIOS boot menu to select the optical drive as the boot device or change your BIOS boot order accordingly. While booting, you'll be asked about your network connection before being presented with a log-in screen. The username and password for the guest account is shown in the top left of the display. It's guest:guest for a normal user, and root:root for a system administrator. Log in as guest and the KDE desktop will launch. We now need to add a single package that we'll use at a later stage. Open the Synaptic package manager from the System > Configuration > Packaging menu and enter 'root' as the system administrator password.

If you've used Ubuntu before, then you'll already be familiar with Synaptic. Click on the search button and type "mtools". This is the package you need to add, and you'll need an active internet connection to enable Synaptic to grab the package from the repository and install mtools into memory. Because this is still a Live CD, any changes you make won't be permanent.

It's now time to insert your USB stick. PCLinuxOS will inform you the device has been inserted, but ignore this and close the window.

THE PARTITION TOOL

We need to create two partitions on the USB stick — one for the root file system and another for your own files. PCLinuxOS includes its own partition tool inherited from the Mandriva distribution, and this is launched from the PCLinuxOS control centre. Either click on the icon in the toolbar or select Configure Your Computer from the System > Configuration menu. Click on the Mount Points page and select the first icon, labelled Create, delete, and resize hard disk partitions. Now for the mandatory warnings; you need to make sure you select the right device in this window and not your internal hard drive. The USB device is usually sdb, with sda being the internal drive. But this is entirely dependent on your configuration.

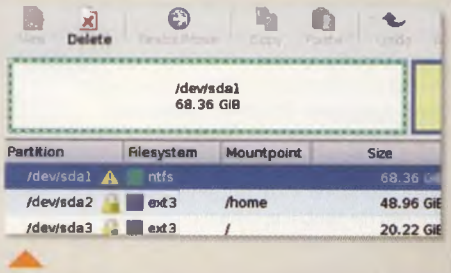
It could just as easily be sda if your internal drive uses IDE. Make sure you've got the correct device by ensuring the size is what it should be. In case you hadn't realised, you're going to completely repartition and reformat the USB stick. This will permanently remove any data on

SPOTLIGHT ON... LINUX PARTITION TOOLS

The partitioning tool bundled with PCLinuxOS is quite poor in comparison to what else is available. This is especially true if you try the resize function to alter the partition size without losing the data. It can often cause problems and isn't recommended without an up-to-date backup stowed away safely.

The king of open source partition tools is GPartEd. It's not included in PCLinuxOS, although it can be installed through Synaptic. GPartEd is much better at handling partition resizing and the user interface is easier to navigate. If you've got a version of Ubuntu you can use this, but if the thought of a GUI puts you off then there's always the perennial "fdisk" from the command line. Surprisingly, you're more likely to have come across this from a Windows installation than a Linux one. It's often your last hope if your disk loses the master boot record or partition table as it can be run from the Windows rescue console.

The Linux version is almost identical: you use a series of single letter commands to edit the disk configuration and write the changes back to the disk. This is essential if your PC refuses to boot and you can't launch a simple window session.



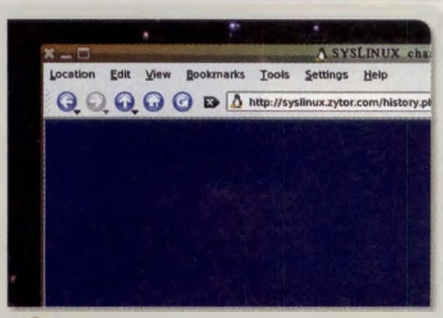
GPartEd is the tool to use if you are having problems with your hard drives or USB partitioning.

SPOTLIGHT ON... SYSLINUX

SysLinux is the tool you used to make the USB stick bootable. You don't actually notice this because you've copied the SysLinux configuration from the Live CD, but it's a fantastic utility that allows the machine to see the Linux distribution as a bootable device. It was developed to help PCs boot into Linux from a variety of storage media that weren't initially developed with Linux support, and there are five modules used by SysLinux depending on the boot media you want to use. We've used the original SysLinux module here as this was designed to boot FAT-formatted file systems, and this is why the root partition is formatted as FAT16 – the most common format for USB sticks.

There's also the ISOLinux tool, beloved by Linux CD/DVD creators for letting them create a disk that boots into more than one operating system. Other modules cater for native Linux partitions as well as booting from a network device using a normal BIOS network boot. This is a great way to distribute and install the same Linux distribution across a network of computers.

The great thing about SysLinux is that you can lump all the files you need for a distribution within a single file. This is needed to hide the Linux file system from the host file system, but it also makes things considerably easier to deploy as you don't need to worry about losing individual files.



SysLinux was recently updated to include many more features.

the selected device. The vast majority of USB sticks are pre-configured with a single partition. When you're certain about the device selection and the data, select this single partition and click on the Delete button.

PARTITION DRIVE

You need to create two partitions: one for the root file system, and another to use for your personal files. First, click on the Toggle to expert mode button to enable a few extra options. Now select the chunk of blank space on your USB stick and click on the Create button that appears. You need roughly the same amount of space as a CD, so enter "770" into the Size in MB field.

From the massive drop-down file system list, select FAT16. This is the most common file system for USB storage and will save you a few problems later on. Ignore the mount point option — this won't be needed for either of your new partitions, and you need to select Primary from the drop-down list that appears when you click on the Preference button. Create the first partition by clicking on the OK button. The partition will appear coloured blue in the table illustration. For the second partition, click on the remaining space coloured in grey.

You should let it fill the rest of the free space on the device, and this time use Linux native as a file system type — this partition only needs to be read from Linux whereas the root partition needs to be read and booted from your system BIOS. Check the primary option in the Preference drop-down list and click OK. When each new partition has been created, click on the Format button to make your changes permanent.

CREATE THE DATA

Click on Done and exit the configuration centre. You should now remove and re-insert the USB stick so Linux can update the file system and copy the contents of the PCLinuxOS CD onto the root file system you created on the USB stick. Open the Konsole from the desktop icon and type "su" followed by "root" to switch to the administrator's account. Type "mkdir/mnt/usbstick", followed by "mount/dev/sda1/mnt/usbstick" to attach the root partition on your USB stick to the file system.

You may need to change "sda1" to reflect your own configuration; it's the same device used by the partitioning tool. Next, mount the CDROM (type "mount/mnt/cdrom"), and copy its contents to your new root partition with "cp/mnt/cdrom/livecdfs.sqfs/mnt/usbstick/syslinux.cfg" and "cp-rf/mnt/cdrom/isolinux/*/mnt/usbstick". You now need to edit the boot configuration file. You could use either Vim or Emacs on the command line, or launch KWrite for a GUI. Open the syslinux.cfg file in the root file system of your USB stick. This file lists each boot option for the boot menu, and you can either copy and paste one of the current entries or edit the LiveCD entry at the top of the file. Rename the label and add "changes=/dev/sda2" to the end of the append line. Back on the command line, type "sync" to make sure the changes are updated and type "umount /mnt/usbstick" to unmount the device. Finally, type "syslinux -sf/dev/sda1" to add the boot code, and "lilo -M/dev/sda" to write the boot menu.

BOOT YOUR USB STICK

That's all there is to it. You've now completed the installation process and all that's left to do is power-on or reboot your machine with the USB stick inserted. You'll see the Lilo menu first, populated with the options you left in when editing the syslinux.cfg file. Select the USB stick option to launch PCLinuxOS off the USB stick. If your PC doesn't recognise the stick, then you need to either load the BIOS boot menu or change the boot order within the BIOS itself.

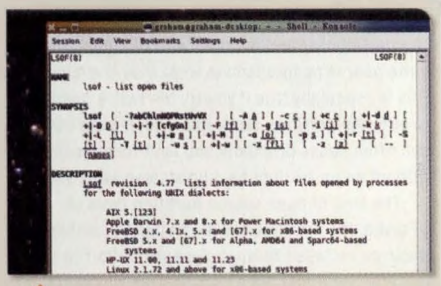
Older machines may not be able to boot from any USB device, but if you really need to use a USB stick, boot a Live CD and select the USB device manually from there. When PCLinuxOS has booted, you should notice that the whole installation feels much quicker thanks to the read/write speed of the USB device, and you can now save your files to the secondary partition you created.

DO THIS... REMOVE USB STICKS SAFELY

When you write data to a USB storage device, there's no guarantee the data is written at that exact moment. This is the result of the operating system storing up read and write jobs so they can be executed in a single batch – speeding up performance and providing a better user experience. However, if you remove the device before the data has been written you'll lose the data. This is why OS X, Windows and Linux ask you to warn the operating system you're about to remove the device – usually by clicking on an icon or menu option.

In Linux, you can also type "sync" on the command line to force the write jobs to do their stuff. You can then safely unmount and remove the device. However, it can only be unmounted when there's no other process using it. There's a command that's perfect for this situation: to "lsof" – list open files. If you follow this command with the device name you want to unmount, all the processes currently using the device (and leaving open files) will be listed.

You can then either close them down manually or use excessive force with the "kill -9 pid" command. When there's nothing left using the device, it's safe to remove it from the computer.


LSOF(8)
NAME
lsof - list open files
SYNOPSIS
DESCRIPTION
Lsof revision 4.77 lists information about files opened by processes for the following UNIX dialects:
AIX 5.[123]
Apple Darwin 7.x and 8.x for Power Macintosh systems
FreeBSD 4.x, 4.1x, 5.x and [67].x for x86-based systems
FreeBSD 5.x and [67].x for Alpha, AMD64 and Sparc64-based systems
HP-UX 11.00, 11.11 and 11.23
Linux 2.1.72 and above for x86-based systems

If you don't have "lsof", install it from your distribution's package.

Supercharge your firewall

Don't just accept default settings — configuring your security system is the route to top-notch security. *Jon Thompson* explains how.

REQUIREMENTS

- **WINDOWS XP OR VISTA**
  We look at configuration options pertinent to both of Microsoft's operating systems.
- **A HARDWARE FIREWALL**
  This is optional, but, if you have one, we'll take a look inside.

INSIDE INFO

- The first stop for extra information about configuring Windows Firewall is the Redmond Giant's own web site. XP users can go to: **www.microsoft.com/windowsxp/using/networking/security/winfirewall.mspx**.
- Vista users should go here: **http://windowshelp.microsoft.com/Windows/en-US/security.mspx**.
- There are a vast number of ports that can be open on a network computer, but what do they all do? This Wikipedia page offers all the answers: **http://en.wikipedia.org/wiki/ List_of_TCP_and_UDP_port_numbers**.
- For tips about securing your router, try this: **www.smallbusinesscomputing. com/webmaster/article.php/3666096**.
- For those readers thinking of taking the plunge into the world of Linux firewalls, here's the Ipchains project page: **http://freshmeat.net/projects/ipchains**.
- Because you still need antivirus software regardless of which firewall you use, here's a page detailing some of the top rated free offerings: **www.thefreesite.com/Free_ Software/Anti_virus_freeware**.

Microsoft has a poor reputation for security. Although it has shipped a firewall with Windows since the launch of XP in October 2001, it was disabled by default. The relatively small number of people using it or third-party firewalls allowed the Blaster Worm of 2003 to spread like the plague. A few months later, the Sasser Worm did the same. In both cases, the infections took advantage of flaws in the software behind TCP ports that should never have been visible from the internet.

Microsoft's response was to launch a campaign that raised awareness of security and informed users of the need to take responsibility for their own protection. Microsoft also improved both the functionality and interface of its firewall, and rebranded it Windows Firewall. Switched on by default in August 2004's XP Service Pack 2, it's still being largely overlooked — but what is it, what does it do and what can it do for you?

YOUR NAME'S NOT DOWN

With Windows Firewall switched on, if you run a program designed to listen for incoming connections, a pop-up gives the name of the program and asks if you want to keep blocking it, unblock it, or be asked again later. If you unblock it, the firewall creates an exception.

Microsoft itself publishes advice on managing exceptions. In summary, it tells you not to allow them manually just because you think you might need them later, and to never instruct Windows to unblock a program you don't recognise. And when you no longer need an exception, be sure to delete it. Provided you have antivirus and anti-spyware systems installed, this might be all you need to do. So, how do you actually go about managing your exceptions?

The first step is to ensure that the firewall is switched on. In XP, go to the control panel and double-click the Security Centre icon. If the firewall is switched off, the relevant section of the resulting summary page will be red. If this is the case, click on the Recommendations... button and press the button marked Enable Now. While you're there, ensure automatic updates are enabled too.

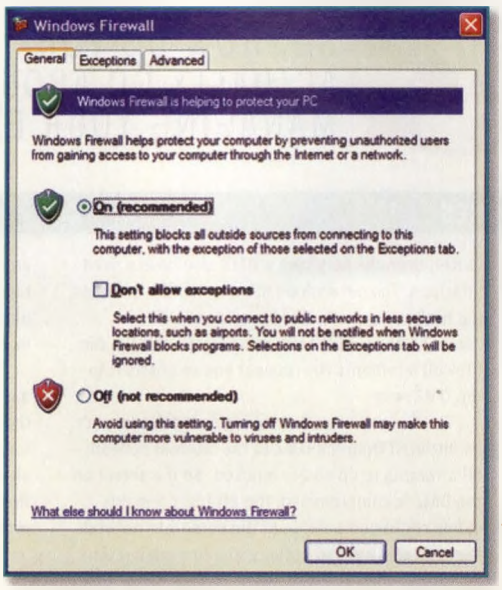
The next step is to understand how to configure exceptions. Return to the control panel and double-click on the Firewall icon. This brings up a tab of general configuration options. Here you can enable and disable the firewall, and you can also put a blanket ban on all of your exceptions. On the other tabs, you can also manually manipulate existing exceptions, open ports, and remove exceptions once they're no longer required, as per Microsoft's advice.

First, click on the exceptions tab. There are a few programs already on the list for the sake of convenience, including AOL and Messenger. These aren't ticked (enabled) by default. This means they're still blocked, but known. This tab also allows you to add exceptions by hand, and to identify the ports they use.

Click on the Add Programs button and a new window will pop up, listing all installed applications. You can select one of these, or if you have one that doesn't install itself traditionally, then you can browse for the executable. Once selected, you can also change the scope of the allowed connections.

Press the Change Scope button and a second window pops up. This allows you to specify whether any computer can connect to this program, only other computers on your subnet, or only specific IP addresses. Press OK, and OK on the program list, and the selected program appears in the exceptions list. Note this also enables the exception.

You can also make individual ports visible to the internet. This is strictly for expert users, but to do so, press the Add Port... button and the resultant pop-up asks you for the name of the port, its number and to specify whether it's a TCP or UDP port. You can also set the scope of the


Windows Firewall
General
Exceptions
Advanced
Windows Firewall is helping to protect your PC
Windows Firewall helps protect your computer by preventing unauthorized users from gaining access to your computer through the Internet or a network.
On (recommended)
This setting blocks all outside sources from connecting to this computer, with the exception of those selected on the Exceptions tab.
Don't allow exceptions
Select this when you connect to public networks in less secure locations, such as airports. You will not be notified when Windows Firewall blocks programs. Selections on the Exceptions tab will be ignored.
Off (not recommended)
Avoid using this setting. Turning off Windows Firewall may make this computer more vulnerable to viruses and intruders.
What else should I know about Windows Firewall?
OK
Cancel

Simple controls make a big difference. Always ensure your Windows Firewall is on before connecting to the internet.

Audit My PC
Security made easy!
Firewall Test
Anonymous Test
Internet Speed Test
Sitemap Generator
Free Software
Security Tests
Firewall Test
Anonymous Test
Popup Test
What's My Ip
Online Tools:
Internet Speed Test
Sitemap Generator
Webmaster Tool
Html Encoder
Keyboard Lessons
Free Address Finder
Free Software
Internal Ip
Internet Hoaxes
Free Help & Support:
Web Security Forum
Yes or No
For your Website:
Broadband Test
Speed Test
Anti-Spam
Website Monitoring
Plugins
Cool Icons
Security Tips:
Intrusion Prevention
Security Tips
AUDIT MY PC
You'll find a ton of free online tools at Audit My PC. Home internet users will enjoy our security audits, speed tests and free software while webmasters will love our website utilities, such as our link checker, sitemap creator and our website monitoring services. There is something for everyone!
Our most popular web tools and security services:
Firewall Test
The key to Internet Security begins with a firewall, but when configured wrong, even the best firewall can leave you exposed and vulnerable. Our free firewall test checks to make sure you are not leaving yourself open to attack. Our port scanner is known for its speed and includes the ability to scan all 65,535 ports.
Broadband Speed Test
This free Broadband Speed Test is extremely accurate, simple to use and results are very easy to understand. Find out if your broadband service provider is really giving you the speed you need. Our speed test is voted 'best on the net'!
Antispam
Antispam is an extremely effective way of taking money out of the pockets of spammers. Help fight spam by using this free tool.
Spam

The web site Audit My PC has a range of security testing tools available for public use, including a useful firewall test.

connections as you can with programs. The exceptions tab also gives you the Edit button, which allows you to explicitly enter the path to the program behind the exception, and the Delete button allows you to delete the exception.

Finally, there's the Advanced tab, the first section of which allows you to define which connections the firewall should manage. It's not a good idea to switch off the firewall on any of these connections. Microsoft recommends that they should all have the same settings.

Next, you can control logging of incoming connections and dropped packets. If you run a server logging successful connections, it allows you to see where incoming traffic is from, and by allowing the logging of dropped packets you're able to see IP addresses of machines that have been sniffing out open ports.

The ICMP section deals with a protocol used to share error and status information. On an internet-facing system, it's unwise to allow these options because they can give attackers free information about your machine. Finally, if you've made a mess of your configuration, or simply want to revert to the factory settings, press the Restore Defaults button. A pop-up warns that this will restore the original settings. Click OK if this is what you intend to do.

MANAGING VISTA'S FIREWALL

The Vista version of Windows Firewall is a leap forward in functionality and security over the previous version, but still has defaults that should work well in the majority of home situations. Reflecting the importance of not allowing spyware or viruses to phone home, it features outbound traffic filtering as well as inbound.

To access the basic firewall configuration options, go to the Control Panel and click Security > Windows Firewall. Again, the firewall should be on by default anyway. If you now click the Change Settings link, you'll see the familiar tabbed pop-up.

The General and Exceptions tabs work exactly as they do in Windows XP. The real difference is when you click on the Advanced tab. This only allows you to control which interfaces the firewall should protect and to restore the factory settings. So where are the other functions, such as logging?

On the Control Panel, click on System and Maintenance and on the window that appears, scroll down to the Administrative Tools icon and click on it. A window opens displaying a list of administrative areas. The last is Windows Firewall with Advanced Security. Double-click on this to see the advanced controls.

The left-hand pane allows you to see a general firewall overview, inbound and outbound rules, connection rules and monitoring options. The middle pane gives details of the selected category. The right-hand pane shows the actions you can take.

Vista maintains various security profiles. In the left-hand pane, click on Windows Firewall with Advanced Security on Local Computer. Unless you're taking your computer to work and connecting it to the corporate network, it's assumed you're connecting it to a public network (in this case the internet itself) so the public profile is active by default.

In the middle pane, click the link marked Windows Firewall Properties in the public profile. A pop-up configuration window allows you to turn the firewall on and off, and to block or allow all inbound or outbound traffic. If you block all outbound traffic, you'll stop viruses and spam

SO, HOW DO YOU ACTUALLY GO ABOUT MANAGING YOUR EXCEPTIONS?

SPOTLIGHT ON... DEMILITARISED ZONES

On networks run by larger corporations, and increasingly even smaller companies, there's often a dedicated spur that's neither secure nor insecure. This so-called demilitarised zone (DMZ) is where any public servers are located, well away from the internal network. DMZs rely on the use of a hardware firewall to service them, as well as to protect the internal network, all the while giving transparent access to the servers designated for public access.

Instead of using a firewall appliance that plugs in between the internal network and the internet router, firewalls servicing a DMZ also have a third interface. The network on this connection contains the mail server, web server and so on. When someone connects to the company's web site, the firewall intercepts the request and redirects it to the DMZ spur.

The firewall has rules saying connections can't be initiated from the DMZ to the internal network – all attempts to do so are blocked. So if a server on the DMZ is compromised, the attacker remains safely contained outside of the corporate network. They will still have to get past the firewall itself to gain access to internal servers and the information they contain. This takes time and, unless deliberately targeting the company, the attacker's likely to move on.

What's more, if the machines on the DMZ have intrusion detection systems installed, or if there's a dedicated system monitoring the DMZ for suspicious activity, administration staff can simply pull the plug on the DMZ interface of the firewall at the first sign of trouble and still provide connectivity from the internal network to the internet.

engines phoning home, but you'll also block all other traffic.

When you run a program requiring an external connection, you'll receive the usual pop-up window asking if you want to continue blocking or to allow access (if there's no rule covering it). In the Settings' section, the Customize... button allows you to switch on and off such blocking notifications. You'll also see the logging section here, with options as per the XP version.

RULES ARE RULES

Now it's time to add a program access rule. In the left-hand pane click Inbound Rules, in the right click New Rule.... You can apply the rule to all programs or just one. If you select the option for a single program, enter the path to its executable. Press Next to either allow all incoming connections, allow secure connections only, or block all. Secure just means they use Vista's IPSec functionality to negotiate a suitable level of encryption. Mostly, you'll simply allow or block incoming connections to the program. Hitting Next allows you to specify which profile the rule applies to. You can leave this as it is, hit Next again, name the rule, and press Finish.

Expert users can also set up a rule to allow or deny connections to and from individual ports. The only difference is that you enter a port number instead of the path to an executable.

ROUTERS

If your network has a broadband router with a firewall, do you also need the Windows Firewall? Absolutely. Your router's firewall is an extra line of defence, and is easily configured, but it's amazing how many people just plug it in and don't give it a second thought.

First, always remember to change the router's passwords regularly, and never connect any device to the internet if it still has a default password. The reason is that default passwords are so well known that unauthorised access is increasingly difficult to call true 'hacking'. Make a point of changing the passwords on all sensitive accounts at the same time each time, and remember to keep the passwords safe.

If you're using Wi-Fi, always use the strongest encryption your router and wireless network cards can handle. Never use the default WEP security, either. This is inherently insecure. Use at least WPA and change the key regularly. WPA-2 is even better.

To prevent neighbours stealing your connection, change the network name (SSID) to something unusual and, if your router supports it, turn down the broadcast power. Also turn off SSID broadcast, because it makes it easy to discover your network. If you can, use fixed IP addresses rather than DHCP to allocate them, and if your router supports it, use MAC address filtering. Take the time to read the manual thoroughly and familiarise yourself with your router. The effort will pay dividends later. Perhaps because of its shaky start, Windows Firewall has unfairly inherited a poor reputation from the original, inactive offering. The assumption that it provides feeble protection has allowed a multi-million dollar industry to spring up providing replacements for what is, in fact, a perfectly good firewall.

It's always a good idea to mix and match security technologies to put off the most determined hacker or worm. But also taking the time to learn how to configure Windows Firewall will ensure you're as secure as can be, whether you also install a third-party firewall or not.

Windows Security Alert
To help protect your computer, Windows Firewall has blocked some features of this program.
Do you want to keep blocking this program?
Name: Test Mail Server Tool
Publisher: Toolheap
Keep Blocking
Unblock
Ask Me Later
For more information about blocking and unblocking a program, see the Microsoft Web site.

Any program without permission to listen for incoming connections causes a pop-up asking what to do. Never unblock a program you don't recognise.

DO THIS... GO OPEN SOURCE

It's always a good idea to install a range of security technologies to thwart both automated attacks and wandering hackers, and firewalls are no exception. Luckily, the world of open source has a number of offerings that can serve as an unexpected second line of defence against anyone who comes sniffing around your ports. Firewalls take up so little computer resource that some people install a second, third or even fourth free offering on the machine they use to connect to the Internet. Though four might be severe overkill, some home users are turning to different platforms in a bid to keep themselves secure. The idea is to frustrate hackers long enough to make them leave your network alone in favour of easier targets elsewhere.

Mirroring its advancing uptake, increasing numbers of people have begun to view Linux as the ideal solution to their firewall needs. The average distribution now ships with thousands of applications. Among these are several firewall offerings, including the sophisticated Ipchains, which allows you to create a hardware appliance with two network interface cards, and it sits between your broadband router and your internal network.

Written originally by programmer Paul Russell, Ipchains is a powerful traffic filtering, routing and accounting solution. The only problem with Ipchains is that administration is done on the command line. This is an issue for users accustomed to the point-and-click ease of Windows. To overcome this, several open source developers have released graphical front ends to Ipchains. Of these, the powerful Webmin system administration tool is both widely used and bundled with the vast majority of current Linux distributions.

Configuring Linux firewalls is now as easy as it is for Windows thanks to the free Webmin tool.

Build a Linux render farm

Graham Morrison can put your old PCs to good use by creating a render farm, or even a distributed compiling engine.

REQUIREMENTS

- **AN OLD MACHINE OR TWO**
  Any machine from the last five years will make a worthwhile contribution to your render farm.
- **LOCAL NETWORK**
  You won't get very far without some form of communication between the various machines.
- **BLENDER**
  The 3D rendering environment of choice for discerning free software advocates everywhere.

Most of us have a collection of old computers that are too slow to be used on a daily basis, but they're also just quick enough to save them from being thrown away or given to less tech-savvy relatives. And it doesn't help that they cost a small fortune just a few years ago. What we want is some way of adding their latent processing power to our current configurations without slowing everything down or being too much of an administrative burden.

Fortunately, you can; if you happen to enjoy processor intensive tasks like compiling software or 3D rendering. Both of these common applications feature tools that can divide the workload across a network of computers. This is because both are purely mathematical tasks, relying solely on the arithmetic prowess of the processor rather than other components within the machine. This means that any additional CPUs you attach to your network can make a positive contribution to your processing potential, even an old 1GHz machine can make a difference, and these machines don't need much in the way of storage as this is shared across the network. They don't even need a keyboard, mouse or video card, as they act as simple dumb terminals. Thanks to Linux, you won't need a licence for each operating system on each machine either.

CONNECTING

Linux is perfectly suited to distributed computing projects because it's an operating system built around network connectivity. This is most apparent with the file system; it seamlessly blends files, partitions, drives, remote storage and processes into the regular file/folder tree. There's nothing stopping the '/home' folder being an entirely separate partition on a computer connected across a network for example. And this is exactly what you need with distributed computing as it provides you with what you need; centralised and shared storage.

When this is blended into the operating system, you don't have to worry so much about configuration. You just need to set up each client to use the same directory for storage and launch the master process. It helps if you can set up each client identically, so that they can be centrally managed as a single resource. Linux helps with this and, if you choose the same distribution, you will find staying on top of daily admin tasks much easier.

HANDY TIP

The queue manager Farmer Joe doesn't have a slick client interface, but it does integrate directly into Blender. This makes it the better solution if you want to use your render farm while building your scenes, as you don't need to leave your project to render a frame. To get the script to appear within Blender, make sure you've copied it to Blender's 'scripts' directory.

With this in mind, we're going to cover what you need to do to build a basic render farm using such a network. One of the most common uses for distributed computing is to accelerate 3D rendering software. 3D scenes can typically take hours to complete on a single machine, and when two or three 1GHz machines combined are the equivalent of a modern processor, and significantly cheaper to build, it's worth a little effort adding them to your network.

3D GRAPHICS

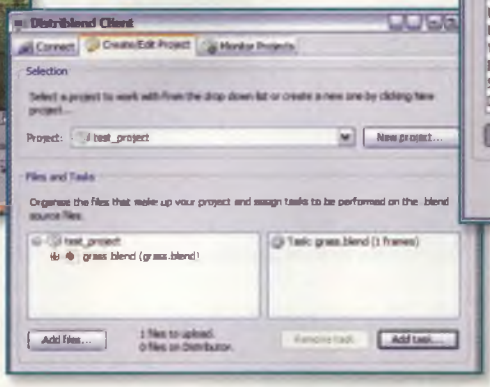
The first thing you need to consider is the speed of the network. Data is constantly moving backwards and forwards between each machine in your farm and, with 3D graphics in particular, the size of the files that are being transferred are going to be large — 10s or 100s of megabytes. This is going to be the only bottleneck, as older equipment is less likely to have the fastest network connection. 10BASE-T, as found on older hardware, is far too slow for this. You might get away with its successor, 100BASE-TX, but even this is likely to cause problems with high data loads.

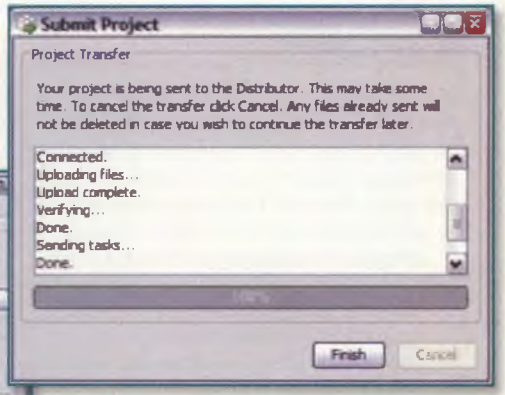
Current hardware sports Gigabit Ethernet (1000BASTE-T), and this is much more capable of handling the speed required to transfer large files. You might want to try the configuration with your current hardware, with a mind to upgrading your older machines if you find distributed computing worthwhile. Upgrades are cheap anyway, with a Gigabit PCI network card typically costing between $50 to $70. Remember that the switch or router you use to connect each machine will also need to be capable of those high speeds.

> LINUX IS PERFECTLY SUITED TO DISTRIBUTED PROJECTS, IT'S AN OS BUILT AROUND NETWORK CONNECTIVITY

In this project, the more machines, or 'nodes', you can add to an extended network, the faster your 'blend' will be.

The best thing about Distriblend is that you can user the client user-interface to add jobs by simply loading the 'blend' project files.




Submit Project
Project Transfer
Your project is being sent to the Distributor. This may take some time. To cancel the transfer click Cancel. Any files already sent will not be deleted in case you wish to continue the transfer later.
Connected.
Uploading files...
Upload complete.
Verifying...
Done.
Sending tasks...
Done.
Finish
Cancel

When you add a new project to the Distriblend network, the resources that each Blender node needs to work with are automatically transferred.

INSTALLATION

With the network out of the way, the next consideration is the Linux installation, and virtually any version of Linux is up to the task. For older machines, the less resources used the better. This is especially true of the X Windows environment, as you will have no need for a graphical interface on the client machines on the network and X Windows is a real resource hog. For this reason, we would recommend a Linux installation without the usual Gnome/KDE desktop, and with as few packages pre-installed as possible. It doesn't need to be an old distribution either, something like Ubuntu's Server edition will work equally well as it doesn't install either the GUI or any superfluous packages, and most distributions offer you server equivalents. The only requirement, over the software we use for the distributed rendering, is for folder sharing, and every distribution we can think of includes this by default.

When building a render farm, the most important decision to get right is which queue manager to use. It's the queue manager that takes the shared content and sends the jobs to each client, managing resources as well as the work flow. There are plenty to choose from — open source and commercial. The most popular open source render queue manager is called DrQueue — it was used on one of the recent *Pirates of the Caribbean* movies, as well as the free software milestone *Elephants Dream*. It's also complicated to use, and while you will no doubt find packages pre-built for your favourite Linux distribution for an easy installation, it's the configuration that takes the real effort.

DrQueue also uses an NFS share for the content, which makes things tough if you need to use a Windows machine. But if you need serious support for Maya, and several other professional 3D environments, then DrQueue might be your only option. Thankfully, free and open source software does have a world beating 3D environment of its own — Blender. It's this that's typically the focus of the open source queue managers that are available (although DrQueue works very well with Blender).

These alternatives might not offer the same scope, but they're a lot easier to configure than DrQueue. The easiest is called Farmer Joe, and is a small self-contained download that will run as well on your Linux box as it will on your Windows machine or even your Macbook. It uses a scripting language to talk to Blender and a shared content directory to manage the data each client needs. The GUI is a simple web interface that can be used to monitor and control the rendering jobs being managed by Farmer Joe. Installation is as simple as editing a few lines in the configuration file. However, Farmer Joe isn't all that flexible, and there's very little feedback on the rendering progress for the jobs in the queue.

INTRODUCING DISTRIBLEND

Recently, a better queue manager has emerged, at least for the newcomer. It's a small Java application called Distriblend, and it uses three different Java executables to build a rendering farm from your spare machines. All you need is Blender and Java, which means you can also use Windows machines within the same farm.

The best thing about Distriblend is that it can manage a job's resources automatically, shuffling the data out to each client without the need for a shared folder or disk device. It's also got a great client application that gives you plenty of feedback and control over the jobs running on your network; installation is through a single zip file. After the inevitable 'unzip' procedure, you're left with three further directories, 'Client', 'Distributor' and 'Node'. These reflect the way Distriblend needs to be configured when in use. The Distributor is the tool that's responsible for shuffling the data to each machine in the network. In other words, the distributor is the server, and each machine that's connected to the server is called a node.

SPOTLIGHT ON... BEOWULF CLUSTERS

One of the real success stories for distributed computing is the use of the free software in Beowulf clustering. This is where parallelism is implemented at the operating system level, which is itself spread across a network of machines. The applications and tools that run on top of this are oblivious to the interconnected nature of the CPU power.

It's the OS that's responsible for distributing processes to other nodes in the network, much like a modern operating system copes with multi-core CPUs. The interconnected nature of the file system, along with open access to the kernel level control over process management, makes Linux a perfect choice when building a Beowulf. Unfortunately, the most popular Beowulf Linux software has recently ceased development. The OpenMOSIX project used LiveCDs to build an informal cluster out of spare machines which together were capable of some serious horse power. However, it was announced in July 2007 that March 2008 would see the end of the project. The developer citing the availability of low-cost multi-core CPUs as being one of the main reasons he felt OpenMOSIX was no longer viable.

The OpenMOSIX project: this popular open Beowulf distribution is closing shop early this year.

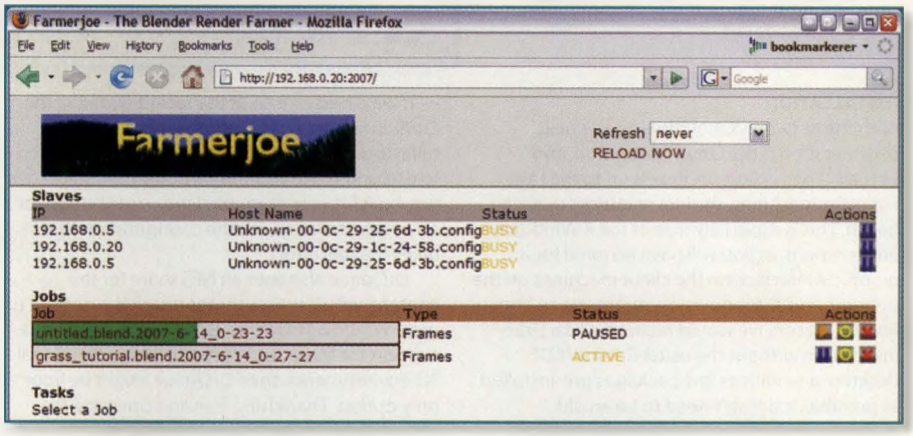
DO THIS... COMPILE ACROSS A NETWORK

Another common use for, and an advantage of, distributed computing is the speeding up of compilation jobs. If you've used Linux for anything more than a couple of weeks, you will have already learnt the painful truth that if you want something to work properly, you need to compile it yourself.

We get used to going through the process time and time again to install a simple piece of software, and while distributed compiling won't help much for the one-off application, it will certainly help if you find yourself constantly re-building the Gnome or KDE desktop, the Linux kernel or even OpenOffice.org. The kernel takes at least eight hours to build, so spreading it over a couple of machines can make it much faster.

The tool you need is called 'distcc'. This is a drop-in replacement for the 'gcc' compiler command used at build time. This means that it's only useful for projects that use the C programming language or its close relatives. But the best thing about distcc is that you don't need to have an identical build system on each machine. Distcc will handle this automatically – all each machine needs is a working GCC build environment. Unfortunately, this precludes Windows unless you install Linux on a virtual machine or use Cygwin.

Ubuntu includes the Gnome monitoring tool you need.



The render queue manager Farmer Joe uses a web-based client interface, but you can still micro-manage the jobs your network is working on.

The Client is simply the front end used to control and manage the distributor.

The first parts to configure are the nodes. On each computer you want to act as a dumb rendering terminal, copy the 'Nodes' directory and type ' java -jar node. jar -c node.conf' to create a configuration file for each node. Open this file and change the administration password, then edit the 'storage.root' parameter to reflect where you want local data to be stored and add the location of the Blender binary to the 'blender. command' parameter. You can now launch the node by typing 'java -jar node.jar -s node. conf -v' and move on to the distributor. It's a good idea to use your main machine for the distributor, as it will be this particular machine that farms out the work to the other nodes. You need to create a configuration file from the Java archive in the same way we did for the node ('java -jar distributor.jar -s distributor.conf -v') and edit the resulting 'distributor.conf' file with the same values as for the node. You will probably notice that there's an extra option for a 'nodes.txt' file. We need to create this file and insert the IP address of each node on a separate line.

Distriblend uses a simple form of user authentication that's based on finding a directory with the same name as a user, and a text file within that directory containing a password. On the machine running the Distributor, create a new directory for each user where 'storage.root' points to the configuration file. Within this directory, create a new file called 'user.ini', and place within this the password for your user on a single line. When you run 'java -jar distributor.jar -s distributor.conf -v' to start the Distributor, the output from the command will inform you of the users it can find.

GET RUNNING

It's now time to run the Client. This is as simple as double clicking the 'client.jar' file, or running it with the 'java -jar' command if you insist on using the command line. Either way, you get a GUI to control your newly built rendering farm. Click on the 'Connect' button and enter the username and password for the directory you created on the Distributor to connect to the server. Switch to the 'Create/Edit Project' tab and create a new project. Follow this by clicking on the 'Add files' button and selecting the Blender project you want to add to the render queue.

The final step is via the 'Add task' button, which will send the project to each of the nodes to work on. You will then be able to watch the progress your network is making from the 'Monitor Progress' page, and also watch all your hard work come together.

SPOTLIGHT ON... LINUX FILE SHARING

There are two widely used protocols for file sharing in Linux. The first is NFS (network file system). This has it roots in the old days of UNIX and is still widely used to mount remote servers onto the local file system. It's insecure though, and should never be used across an open or untrusted network without extra security. Performance can also be a problem, but the biggest issue with NFS is its lack of support in other OSs.

When using Windows, for instance, you need to resort to a commercial solution to read an NFS share and even when you do, you lose many of the advantages that makes Linux worthwhile. Which leaves us with the second protocol – Samba. Samba's main purpose is to bring Windows file and printer sharing support to open source. This means it's the best choice if you want your distributed computing network to interface with Windows.

Samba is actually such a good solution that many system administrators will use Samba running on a Linux machine as their domain controller for a network of interconnected Windows machines. Samba is even built into Apple's OS X, which makes it a great solution for all platforms.

R Properties
General Sharing Customize
Local sharing and security
To share this folder with other users of this computer only, drag it to the Shared Documents folder.
To make this folder and its subfolders private so that only you have access, select the following check box.
Make this folder private
Network sharing and security
To share this folder with both network users and other users of this computer, select the first check box below and type a share name.
Share this folder on the network
Share name: R

Lots of OSs, including Samba, will file share with Linux.

Spruce up your video

***Christian Darkin* gets creative and shows you how to produce video effects for your movies using Jahshaka.**

REQUIREMENTS

- **JAHSHAKA**
  A free open source video effects package available from **www.jahshaka.org**.
- **SOME VIDEO CLIPS**
  You'll need a few of these to help get you started.

Video effects used to be the domain of packages like After Effects and Combustion. Not only are these expensive, they're also complex pieces of kit which require a lot of time and effort to learn.

However, now that video has become more popular with the masses, everybody wants to be able to create the kind of effects they see on television every day. Jahshaka is a free, open source package which allows you to do just that; you can import any video clip at any resolution and apply a range of animated effects to it, then combine it with other clips and even paint frame by frame onto your shots. In this Workshop, we're going to take a look at a few of Jahshaka's tools and try out some effects of our own.

START ANIMATING

Our first job in this project is to create a fly-through in which a video clip is animated onto and around the screen to finally end up at the centre. Jahshaka lets you animate the position, scale and rotation of any number of clips in 3D, allowing you to create some very complex effects.

Now load a video clip by right-clicking on the Jahshaka desktop and select Load to import a video clip of your choice. The desktop is just a handy place to keep all the media in your projects.

Now switch to the Animation layout using the button at the bottom left, and you'll be presented with a blank screen because your animation is empty. Now add a new layer by clicking the Add layer button and the missing media image will appear on the monitor.

Hit the Get desktop button and you'll be taken back to the desktop, where you can choose a clip to work with, and click return. Back in the animation layout, you're ready to start animating. To locate the frame on which you want your footage to reach its final position, drag the red triangle of the playback head to the time indicator in the middle of the screen. Finally, click the Add keyframe icon at the bottom of the monitor.

MOVING YOUR FOOTAGE

Rewind your footage using the playback controls under the monitor and switch to the Controls tab. You'll now be able to either drag your footage around, or use the sliders on the controls tab to place your footage at the point you want it to begin. We placed ours just off-camera, way back on the z axis, and added a little rotation for good measure. Now click the

HANDY TIP

You should have some idea of what you're trying to achieve with your effects when shooting your footage. Decide how you're going to create your effects and get exactly the shots you need. Often the most important of these is a few seconds of your shot with nothing going on and no movement. This gives you an empty background into which you can construct your effect in Jahshaka.

> EVERYBODY WANTS TO BE ABLE TO CREATE THE KIND OF EFFECTS THEY SEE ON TELEVISION

SPOTLIGHT ON... CHROMAKEY

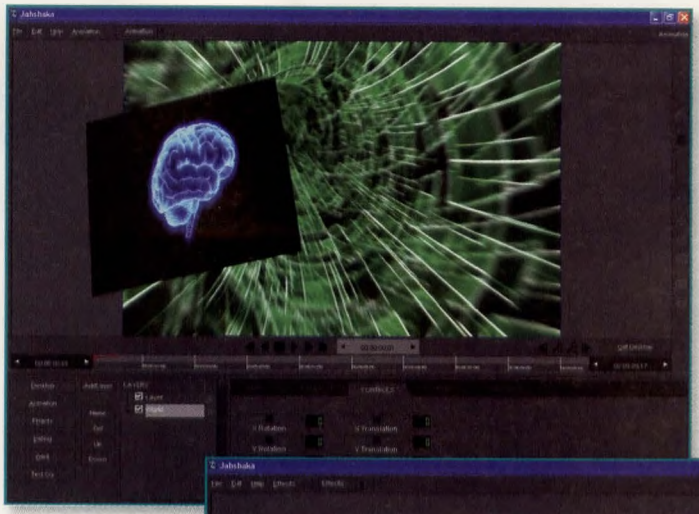
If you want to create some real Hollywood-style effects, chromakey is a great tool to have. Simply shoot your footage against an evenly lit, single coloured backdrop (blue, green or yellow are used quite often) and apply the keyer from the desktop, then remove the background and replace it with any other still image or video clip. The possibilities are endless – you just need to have a little imagination and creativity.

Shoot your footage against a coloured background for a good effect.

HANDY TIP

By default, the duration of your effect will be the duration of the first clip you load into it. However, you can change this if you want by setting the figure at the right of the timeline to the length you want your effect to be.

Add keyframe button again. Finally, hit Play, and your footage will fly gracefully into frame. You can add as many keyframes as you like and, if you want to, you can add extra layers with more video clips.



Drag your footage around on the background. When finished, it should move around the screen. You can add additional layers to your video.

Animate and rotate your clip onto another screen with Jahshaka. Or you could even scale your clip to be 3D.

COLOURS AND FILTERS

Jahshaka also lets you add effects filters to the images themselves, so we'll do a little colour correction to a piece of video to give it a more cinematic look. Much of the process is quite similar to animating. Select the Effects menu — this time the layer is already set up for you with a missing media graphic displayed. Load in a video clip from the desktop as before using the Get desktop button.

We now need to choose and add an effect. These are grouped into CPU (effects handled by the CPU), GPU (effects handled by the graphics card) and RT (Realtime effects). Start by adding a colourise filter from the CPU list (to the left of the layers list). All the effects you add appear in the layers list, so you can turn them on and off or re-arrange them at will. Switch to the controls tab and you'll find adjustments for the clip's colours, brightness, saturation and hue. We're going for a film-style look, so we take the gamma and brightness up whilst reducing the saturation. This gives a high contrast image with slightly muted colours, or you could animate these values by adding keyframes too.

TEXT AND TITLING

We've recorded a video interview and now we want to add a caption for the interviewee, so it's time to do some titling. To do this, select the Text CG button and the package will switch to titling mode. Select the World layer and use Get desktop to retrieve the clip of the interviewee; with the World layer turned on (check the box next to it) your footage appears as the background.

To add some text, click Add layer and choose a text type. We're going for Polygon because it's a simple, plain text. The word Jahshaka should appear on-screen but you can alter it using the layers tab, which also provides control over the style, colour and font of the text, as well as allowing you to add 3D extrusion.

As before, the controls window allows you to manipulate the title in 3D space, rotating, zooming and scaling it as well as positioning it on-screen. You can also set up keyframes to bring the title in and out.

Add as many layers as you like. In the case of an interview caption, this might mean one layer for the interviewee's name, one for their job title and one for the program's logo. You might also consider having a separate graphical layer providing a background strip on which the title will appear. Alternatively you could create the whole title in a still image editor like Photoshop and import it — this allows each layer of text to be animated separately so you can be as creative as you like with it.

> IF YOU'RE CREATING A LONGER PROGRAM WITH SEVERAL CAPTIONS OR SCREENS, DEVELOP A CONSISTENT HOUSE STYLE

If you're creating a longer program than an interview with several captions or text screens, it's a good idea to develop a consistent house style; simply save the animation when you've finished creating it, then you only need to replace the text for all your other captions and they'll all have the same animation, typeface and colours for future projects.

EDITING

Jahshaka is not a video editor, it's a special effects package, so you're better off with Windows Movie Maker or another video editing program for cutting together a complex scene. However, when you're doing special effects you often need to make simple cuts and link together a few shots to form a sequence. You might also need to cut down a longer shot into more workable chunks. Jahshaka provides a set of basic editing tools for just this purpose.

DO THIS... ADD MORE EFFECTS

You could try adding some of the other effects Jahshaka has to offer to get more effective results. There are plenty of them and although a few (the RasFX group) are only available on Linux at the moment, most will work on any system you have. The effects range from image adjustment tools for altering the colour, blurring and sharpening the clip to distortion effects like ripple and twirl, and painterly effects like emboss and charcoal.

HANDY TIP

Jahshaka is evolving at quite a rate – new versions, updates and features are appearing all the time, so it's worth checking out the web site every so often to see if it can do anything new that you might be interested in. There's also a selection of tutorials online, guiding you through some of the more advanced features.

Switch to the editor and use Get desktop to bring in a clip. If you've used a video editor in the past, the display should be vaguely familiar — a timeline at the bottom of the screen displays your clip and you can scrub through it by dragging the white playback head at the top. The in and out points of your clip are marked in the green frame displays, and you can cut your clip to size by dragging on them. The monitor should display the current frame as you drag on the in or out point, so it's fairly easy to locate the point where you want to cut.

To create a cut you need something to cut to, so choose Get desktop again and pick another clip to follow your first shot. This appears on the timeline after your first clip and can be edited in the same way (the in and out controls will refer to whichever clip you have selected at the time).

You can also divide up a shot by moving the playback head to the frame where you want to split the clip, then hit 'S'. The two shots can be separated by simply dragging them around the timeline or deleted (by hitting delete). You can even add extra tracks if your edit is more complex, using the tracks button at the top-left of the timeline.

VIDEO PAINTING AND OUTPUT

Return to the desktop, select the Paint button and use Get desktop yet again to grab another piece of video. The paint tool is roughly equivalent to what you'd find on a still image editing package, but with one important difference. With video painting, you're painting on individual frames. Switch to the Tools tab and you'll see the choice of paintbrushes and shapes you can use to paint. You can alter the colour and size of the brush just as you would with any other available paint package. If you choose one of the filled shapes, you can pick the outline colour and alpha (transparency) of the shape you'd like. It also lets you create a fade between the background and fill colours using the gradient angle slider (a gradient angle of zero creates a single colour fill).

When you've finished painting the frame you won't need to do it all again for the next frame, you can simply use the copy and paste options at the bottom-left to paste paintings onto other frames you use in the future. Video painting is useful for creating quick animations which have unpredictable motion so they need to be painted by hand — for example, the muzzle flash from a gun might be painted in over a few frames to signify motion, or a background colour could be painted on top of an unwanted element (like an advertising billboard).

HANDY TIP

If you want to have a keyframed animation pause, simply insert an extra keyframe at the end of the pause with the same value as at the start. For example, to have a title fly in, sit on-screen for a few seconds and then fly out, you'll need the fly-in keyframes, two keyframes for the central position (at the start and end of the pause) and then the fly-out keyframes.

THE END RESULT

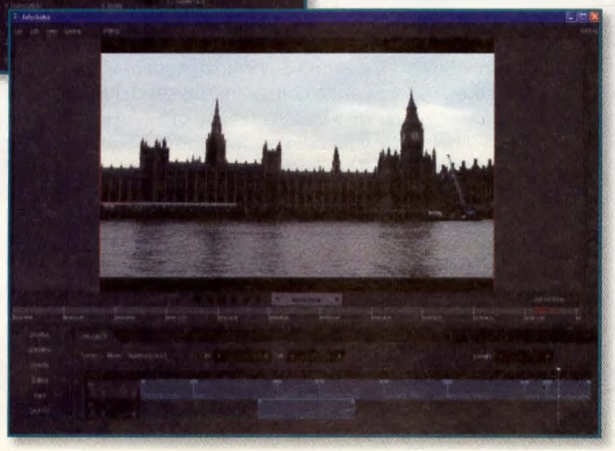
Jahshaka shows the final effect as a series of still frames ready to be re-assembled in the editor of your choice (the frames will be numbered, and most editing packages can import still sequences relatively easily). By creating still images, Jahshaka preserves the image quality and gives you the best possible range of options for working on your clip further. You need to be organised with your frames because if you're not vigilant about naming your shots and storing them in carefully named folders, things can get messy (as there will soon be hundreds, or maybe thousands, of still frames from previous projects).

To render, simply click the bottom icon on the far right of the screen. When completed, the finished shot is available on the desktop for further work.

If you want to alter the style, size and compression of the rendered images, switch back to the desktop and use the preferences button at the bottom of the screen to carry this out. If you're using Linux and want to create an MPEG clip of your finished render, you can now do so by hitting Play with your rendered scene selected and then using the utility menu. apc

> THE MUZZLE FLASH FROM A GUN MIGHT BE PAINTED IN OVER A FEW FRAMES TO SIGNIFY MOTION

When it comes to adding captions to describe an interviewee, you'll have to do some titling. Create different levels of description: one for the person's name, another for their job title and another for the program's logo.



Jahshaka has many effects tools on offer, and will show your final video as a series of still frames. Re-assemble these in your chosen editor.

SPOTLIGHT ON... KEYFRAMES

When you add keyframes to create animated motion or change filters when necessary, they can still be edited by going to the correct frame and changing the value of the keyframed effect. The left and right arrow buttons by the keyframe icon allow you to jump to the next or previous keyframe instantly. However, you can also look at and alter the keyframes tab which shows how each effect changes over time as a graph. The points on the graph are keyframes and you can alter them simply by dragging them up and down to get what you want.

Pro-Q USB 2.0 Motorized Motion Tracking Webcam

Speaking of privacy, Pro-Q's motion tracking webcam has sinister Big Brother overtones about it, but really it's just a better way to video chat. The cam tilts up, down, left, right and has a 4x zoom (for what, we're not exactly sure). You can chat on MSN, Yahoo and Windows clients, just don't forget to do your hair and make sure there's no lunch stuck in your teeth.

CONTACT Anyware
ONLINE www.anyware.com.au
PRICE $89
VERDICT ★★★☆☆

Picture Solar Key Ring

Tech bling: we're always looking for new ways to wear it. The latest flashing gizmo to cross our Downtime desk is this solar-powered keychain. You provide the pic of Steve Jobs, and the keychain advertises your love by flashing. We won't say it will help you score IT jobs, but let's just say you won't go lonely if you're carrying it.

CONTACT OfficeRange
ONLINE www.officerange.com.au
PRICE $7.95
VERDICT ★★★☆☆

Plantronics .Audio480 Phone Booth Discrete Portable Headset

We've always liked the look of phone headsets in public, especially on the train — we like to imagine we're that headset-wearing guy who hangs around Lando Calrissian. This set claims to give you the feeling of being in your own personal phone booth. Anti-social, but that's the price of being connected — it stops commuters talking to you too.

CONTACT Anyware
ONLINE www.anyware.com.au
PRICE $119
VERDICT ★★★½☆

LG Viewty (KU990)

It's not often we get excited about phones… oh, yeah, we get excited about them all the time. This time we're raving about the 5-megapixel camera in LG's Viewty phone. The Viewty has manual and auto focus, a flash, ISO 800 for nightclub pics, and a 3in touchscreen. Direct uploads to YouTube mean you can threaten people's personal privacy at will.

CONTACT LG
ONLINE http://viewty.lgmobile.com
PRICE $899
VERDICT ★★★★☆

HANNSa.red

As if Mac users needed further encouragement, someone has gone and crafted this in-your-face, Apple-themed television. The 9.6in TFT screen has an 800 x 600 resolution, a headphone port and inbuilt speakers. It's not widescreen, but it does have "life-like" leaves and a metal inner structure. Feel free to email us with any OS X puns.

CONTACT Hannspree
ONLINE www.flatscreenavenue.com.au
PRICE $549
VERDICT ★★★★☆

Epson EMP-TW2000

Is it just us, or are the specs on projectors getting way out of hand? Take this EMP-TW2000 for example, which boasts a 50,000:1 contrast ratio — that's more contrast than you can poke a remote at. This box pumps out movies in 1,920 x 1,080p with the inkiest of blacks Epson's catchy DeepBlack technology can muster (which is quite inky).

CONTACT Epson
ONLINE www.epson.com.au
PRICE $4,999
VERDICT ★★★★☆

Echologic Digital Picture Frame

More news from the leather-gadget department: last month it was the Apacer leather finish MP3 player, this time we're raving about this black leather digital photo frame. It's an 8in panel with 800 x 600 resolution, 128MB memory (plus memory card slot) and a remote. Your photos will never look more compelling than they do in leather, just keep the bubble bath away.

CONTACT Echologic
ONLINE www.echologic.com.au
PRICE $279 for 8in frame
VERDICT ★★★★☆

Altec Lansing Upgrader Series

Are your ears massive? Good for you Dumbo. A library of ear measurements were used to make these headphones so they should be comfortable. The 'phone boffins have finally ditched the one-size-fits-all approach (about time, it was a killer on Big Ears over there in the corner) and have gone with a range of styles and sizes for different situations.

CONTACT Altec Lansing
ONLINE www.alteclansing.com
PRICE from $49.95
VERDICT ★★★★☆

Kane and Lynch: Dead men

***Jake Sekulla* forgot to take his meds this morning.**

Kane and Lynch: Dead Men (K&L), from Eidos Interactive (Hitman series, Tomb Raider), has been described as a cooperative action game depicting the violent and chaotic journey of two men.

Adam Marcus (aka Kane), is a consultant when a family tragedy sees him change careers to become a mercenary for The 7, a brotherhood of mysterious men. Kane flees Venezuela with a fortune in diamonds after a job goes wrong, only to be pinched and sent to death row, where he meets the paranoid schizophrenic Lynch. An explosion sees Kane and Lynch on the run together. Shortly after, they discover the transport was ambushed by the surviving members of The 7 who, with the threat of killing Kane's family, want to recover the loot.

Essentially an armed combat title, K&L provides a wide, if not predictably common, variety of weapons (pistols, shotguns, rifles and autos). The big difference to an otherwise everyday kill-crazy rampage is the sense of "team" gaming, where swapping weapons with friends and fallen foe, gaining ground and moving between cover points is the best way to progress.

A single player campaign is around eight hours, with enough plot twists to keep you interested despite some (potty-mouth alert) dialogue and Lynch's incessant moaning and general negativity.

K&L multiplayer is a great idea (eight crooks pulling heists) but is poorly implemented . The anonymity of the interweb translates into incredible mistrust and paranoia which ultimately sets the scene for a double cross… or an octo-cross, whatever.

What ruins this is the static nature of the AI. Guards and police are predictable with static spawns spoiling any and all surprise.

K&L is a fairly decent game just incredibly similar to Scarface.

AVAILABLE PLATFORMS: PC-DVD, PS 3, XBOX 360

CONTACT	Atari
ONLINE	www.kaneandlynch.com
PRICE	$89.95
✔	Great concept; multiplayer.
✖	Multiplayer; dialogue.
VERDICT	★★★½☆

"Don't you dare shoot me, you dirty traitor."

"Officer, stop blocking the damn exit, I'm trying to escape here!"

Metroid Prime 3: Corruption

***Peter Dockrill* is free to use any methods necessary.**

Remember that bit in *The Empire Strikes Back* when all the bounty hunters congregate on the Star Destroyer to hear Darth Vader's outline for capturing the Millennium Falcon? I love that scene. It may not have all that much to do with the latest instalment in the Metroid Prime series, *but*: a) both MP and SW are dripping in dense sci-fi atmosphere, and b) both involve bounty hunters.

Metroid Prime 3: Corruption is the supposed closer in the Metroid Prime trilogy and sees you reprise the role of bounty hunter Samus Aran, who this time is charged with helping the Galactic Federation fend off attacks from Space Pirates. Overly obvious names aside, Corruption, like the rest in the series, offers equal parts adventure and FPS. You'll be solving puzzles, interacting with objects and exploring territory just as often as blasting away in alien shootouts and boss fights.

Aside from slicker graphics and sound (finally including dialogue) and an overall more cinematic polish, Corruption doesn't tamper too much with the Prime template — with one exception: control. The move to the Wii has replaced traditional console FPS controls with two-handed operation using the Wii Remote and Nunchuk.

In a setup similar to PC FPS gaming, the left hand controls movement and strafing while the right hand controls aiming and shooting. The one difference — billed somewhat melodramatically by Nintendo as "a quantum leap in control as you take aim at evil" — is that, unlike the mouse, the Remote allows you to actually aim at the screen. PC gamers may bemoan the so-so accuracy, but what the Remote lacks in sensitivity it more than makes up for in terms of *legitimacy* — pointing the Remote at the alien grizzly you're terminating is inevitably more realistic-feeling than laterally clicking on it with your left mouse button, recalling the light-gun days of yesterday's arcade and helping to explain why those home conversions of Operation Wolf always faced a difficult sell.

All up, MP3 is a heck of a lot of fun and genuinely hard to fault.

AVAILABLE PLATFORMS: PC-DVD, Wii, PS 3, PSP, XBOX 360, NINTENDO DS

CONTACT	Nintendo
ONLINE	www.nintendo.com.au
PRICE	$99.95
✔	Slick controls; great atmosphere.
✖	Controls aside, not a *huge* leap.
VERDICT	★★★★½

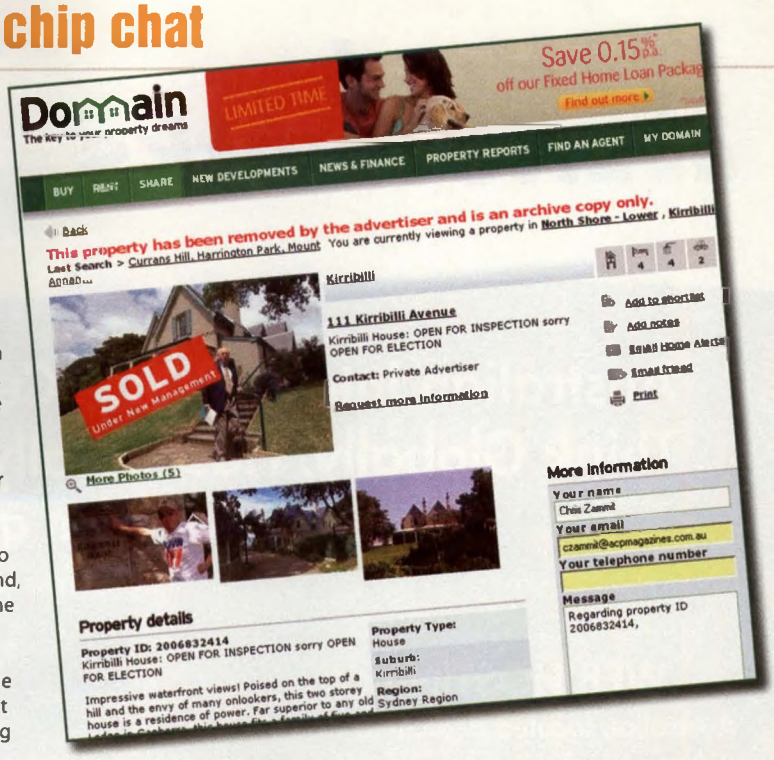
A bounty hunter's work is never done. There's a steady stream of Space Pirates to capture.

apc chip chat

by Peter Dockrill

Unreal estate

Ah... the heady days of Election '07. The relentless campaigning, the me-too-isms, the gaffes, the posturing, the worm scandals, the low blows and high ideals, the scare-mongering, the smear campaigns, the Don's parties... and the battle for the future of the country. All up, you'd have to say it was one hell of a circus. And, in the final days leading up to the big event, one little sideshow which didn't go unnoticed by thousands of inboxes around the nation was this humble (and just a tad premature) property listing on domain.com.au — for sale: "111 Kirribilli Ave, Kirribilli House... Impressive waterfront views!... Far superior to any old Lodge in Canberra... Perfect place to view Sydney's fireworks — especially during events like the APEC long weekend... Ideal for extra-curricular fund-raising activities... Plans for $500,000+ renovation of the dining room to re-enact the predicted last supper... Uses 28-times more water than the average Sydney household — one of few properties that can be credited for creating its own mini-drought... Price negotiable, just like your WorkChoices employment contract... NOT." Ah, those online real estate pranksters — or maybe just prescient pollsters?



HOMEBODIES REJOICE!

The whole Facebook thing has simultaneously challenged, broadened and distorted the notion of friendship. (Do you really have 287 'friends'? When was the last time you saw them? etc.) Well, thanks to Colgate's latest promotion, we can now attach a similar degree of uncertainty to the concept 'party'. Their recent press release, with the snigger-inducing title of 'Homebodies rejoice as online dance parties take hold', really goes to the root of the whole 'party' idea. *What is* a party? Is it navigating to a corporate web site, organising a "virtual bash... naming the party, uploading a photo as the host, adding music, inviting friends [there's that word again] to attend...", all with the incentive of winning a cash prize funded by toothpaste sales? Is this the future? Agoraphobics, 12-year-olds, dentists and time travellers may care to visit *www.maxwhiteparty.com.au*. The rest of us will be in the world.

It's called choice

Bait advertising. It's 2008, but unfortunately it's still kicking around. Like it's not bad enough that we've got horse flu and climate change to deal with. You know how it goes: suckers sniff a bargain and can't help their sorry selves. And so it was with confuddled bewonderment that your hapless pawn of a writer laid his dollar-sign eyeballs on the incoming email: "5,000 seats for 5 cents!" it promised, "Gather your loose change for Jetstar's lowest fare EVER!!". A holiday for ten cents? Count me in. Eagerly I entered my details and selected my chosen route. Sorry, try again, it said. So I did, again... *and again*. And so passed the rest of the evening, as the site continually buckled under the weight of public demand and refused to process my order, until, at long last: "Sold out! We are very sorry you missed out!

Jetstar.com
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Select flights
Passengers & Payment
Confirmation
SOLD OUT!
JETSTAR'S UNBELIEVABLE 5 CENT SALE
We are very sorry you missed out! Due to an overwhelming response, the Jetstar 5 cent sale
Keep your eye out for future JetMails with more great sales and offers.
Jetstar.com

Due to an overwhelming response, the Jetstar 5 cent sale has now sold out. Keep your eye out for future..." And that's how it played itself out. The thing with these offers is that the deal can only ever apply in reality to a limited amount of the target audience. All they're actually offering most folk is the chance to sit in front of their PCs in aggravation and waste an evening fruitlessly trying to log on: IMHO, it's sheer abuse of the internet (and all to distract consumers from the launch of a rival). If only 5 cents was all it cost. Next time, readers may do well to heed Jetstar's own slogan: "Australia, you have a choice." apc

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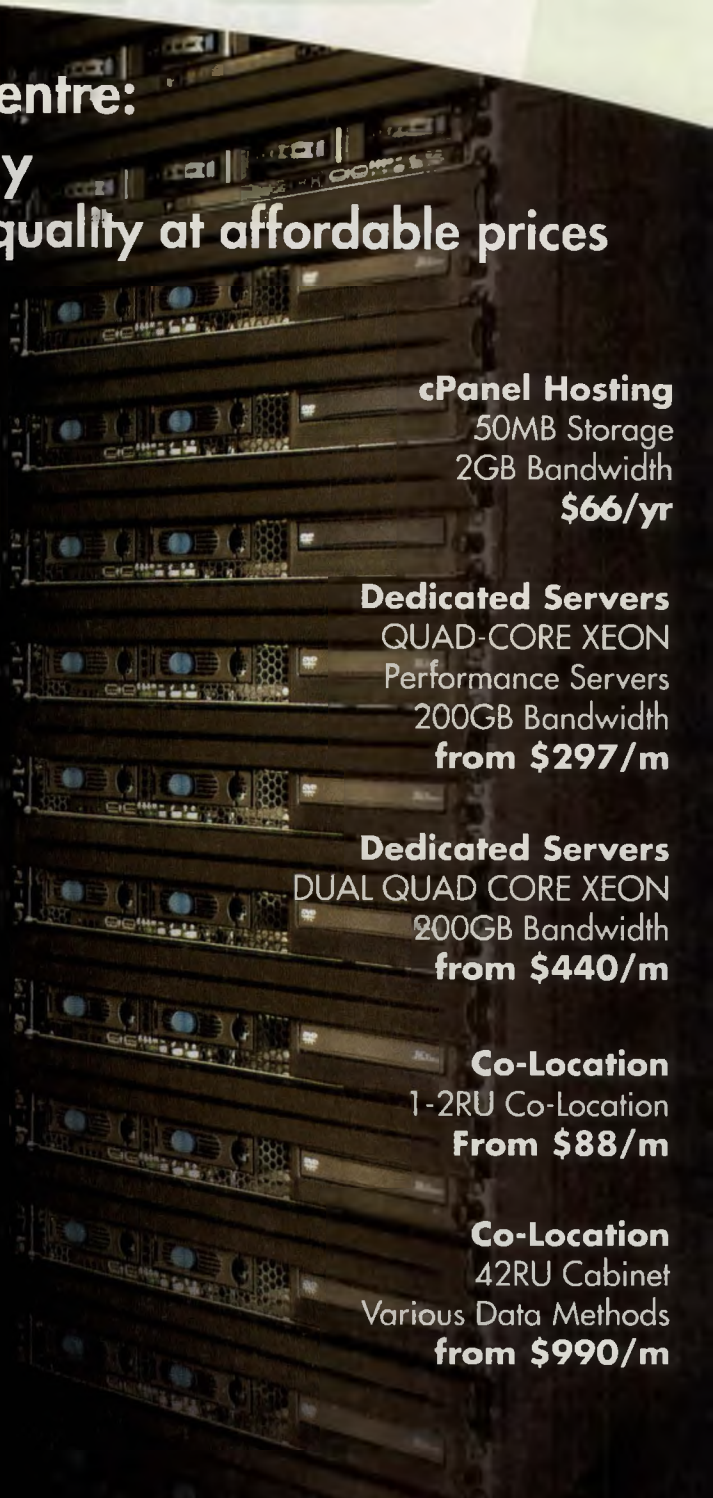

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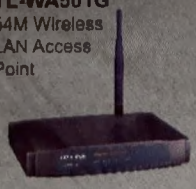

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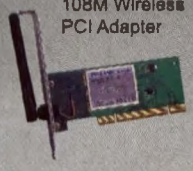

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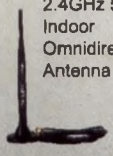

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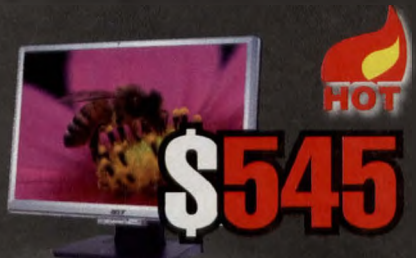

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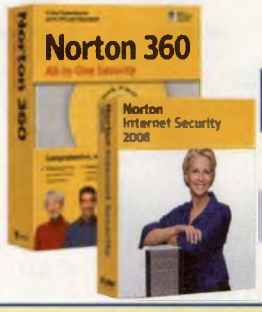

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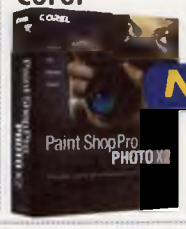

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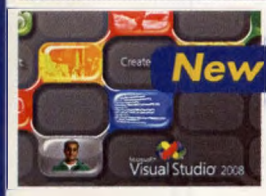

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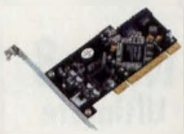

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Model	TONNY
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10N0026 (#26)	$39.00
15M0120 (#20)	$41.00
18C0031 (#31)	$35.00
18C0034 (#34)	$35.00
18C0035 (#35)	$37.00

Model	TONNY
18L0032 (#82)	$39.00
18L0042 (#83)	$41.00

Brother Toner Cartridges

Model	TONNY
TN-100	$23.00
TN-200	$23.00
TN-2025	$59.00
TN-300	$23.00

Model	TONNY
TN-3060	$65.00
TN-8000	$23.00
TN-6600	$65.00
TN-7600	$65.00

Epson Toner Cartridges

Model	TONNY
EPL-5700	$49.00
EPL-5900	$49.00
EPL-6200	$49.00

Lexmark Toner Cartridges

Model	TONNY
Optra E210	$59.00
Optra E310	$69.00
Optra E/E+	$59.00
X215	$59.00

HP Black Toner Cartridges

Model	TONNY
92298A	$ 65.00
C3906A/F	$ 49.00
C3903A	$ 59.00
C3909A	$ 95.00
C4092A	$ 49.00
C4096A	$ 65.00
C4127A	$ 65.00
C4127X	$ 80.00
C4129X	$ 95.00
C4182X	$135.00
C7115A	$ 49.00
C7115X	$ 65.00

Model	TONNY
C8061X	$ 85.00
Q1338A	$ 95.00
Q2612A	$ 59.00
Q2613A	$ 59.00
Q2613X	$ 69.00
Q2610A	$ 75.00
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Q5942X	$125.00
Q5949A	$ 59.00
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Q6511A	$105.00

TONNY Colour Toner Cartridges

Printer Model	Model	TONNY
HP LJ1500/2500, Canon LBP2410	C9700A (BK)	$65.00
	C9701/2/3A (CYM)	$79.00
HP LJ4600	C9720A (BK)	$155.00
	C9721/2/3A (CYM)	$185.00
HP LJ4500, Canon LBP2460/2040	C4191A (BK)	$59.00
	C4192/3/4A (CMY)	$69.00
HP LJ8000	C4149A (BK)	$89.00
	C4150/1/2A (CMY)	$155.00
Epson C900/1900	S050100 (BK)	$79.00
	S050097/98/99 (CMY)	$119.00
Epson C1000/C2000	S050033 (BK)	$90.00
	S050034/5/6(CMY)	$119.00

Samsung Toner

Model	TONNY
ML-1210D3	$ 59.00
ML 1650D8	$105.00
ML-1710D3	$ 59.00
ML-2010	$ 59.00
ML-2150D8	$140.00
ML-4100D3	$ 83.00
ML-4500D3	$ 73.00
ML-6060D6	$ 93.00
SCX-4216D3	$ 59.00
SCX-5312D6	$ 79.00
SCX-D4200A	$ 69.00
SF-5100D3	$ 59.00

Canon Toner

Model	TONNY
E-31	$85.00
EP-22	$49.00
EP-25	$49.00
EP-26	$69.00
EP-32	$65.00
EP-52	$80.00
FX-3	$59.00
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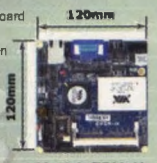
- VIA Vinyl 6 Channel Audio
- 6 USB 2.0 ports
- VIA 10/100 LAN
- VIA TV Out (HDTV)
- LVDS/DVI (optional)
- **Nano-ITX (120mm x 120mm)**
- Digital Media and Mobile Entertainment



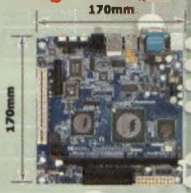
Model: EPIA-N

- All in One
- VIA C7™/Eden™ Processor onboard with Integrated UniChrome™ Pro AGP graphics w/MPEG-2 acceleration
- DDRII 400/533
- 1 PCI slot
- Vinyl 6 channel Audio
- IEEE 1394 Firewire
- 6 USB 2.0 ports
- 2 COM ports
- GLAN Controller
- TV Out (HDTV)
- LVDS/DVI (optional)
- **Mini-ITX (170mm x 170mm)**
- Digital Media. Entertainment, Set Top Box

Model: EPIA - EN

Powerful and Flexible Digital Media

- All in One
- VIA C7™ Processor onboard with Integrated UniChrome™ Pro AGP graphics w/MPEG-2 acceleration
- DDRII 400/533
- 1 PCI slot
- Vinyl 6 channel Audio
- 8 USB 2.0 ports
- 1 COM port
- 10/100M LAN
- TV Out
- **Mini-ITX (170mm x 170mm)**
- KIOSK, Thin Client



Model: EPIA - CN

- All in One
- VIA C3™/Eden™ Processor onboard with Integrated Unichrome AGP graphics w/MPEG-2 Acceleraton
- DDR 266
- CardBus/CompactFlash Support
- 1 PCI slot, 1 Floppy Connector
- Vinyl 6 channel Audio
- IEEE 1394 Firewire
- 4 USB 2.0 ports
- 2 COM ports
- VIA 10/100 LAN
- TV Out
- LVDS/DVI (optional)
- **Mini-ITX (170mm x 170mm)**
- Wireless Media,Kiosk Set Top Box

Model: EPIA - MII

Hard Working Small&Quiet Systems

- All in One
- VIA Luke CoreFusion Processor with Integrated UniChrome Pro AGP Graphics with MPEG-2/MPEG-4 Acceleration
- DDR 400 DIMM
- 1 PCI slot
- 2 SATA ports
- VIA Vinyl 6 Channel Audio
- 8 USB2.0
- 4 COM ports
- 2 VIA 10/100 Ethernet (1 optical Gigabit)
- 1 Digital I/O 4GPI/4GPO
- LVDS/DVI (optional)
- **Mini-ITX Form Factor (170mmx170mm)**
- Always-on Point of Sales Applications

Model: EPIA - EK

Digital Media and Entertainment

- All in One
- VIA C3™/Eden™ with Processor onboard Integrated Unichrome AGP graphics w/MPEG-2 Acceleraton
- DDR 266
- 1 PCI slot, 1 Floppy Connector
- Vinyl 6 channel Audio
- IEEE 1394 Firewire
- 4 USB 2.0 ports
- VIA 10/100 LAN
- TV Out
- LVDS/DVI (optional)
- **Mini-ITX (170mm x 170mm)**
- Digital Media and Entertainment

Model: EPIA - M

19" Mini-ITX Rackmount

Model No.:7677

- 19" 1U Rackmount
- Internal 3.5HDD x 1
- PCI Expansion Slot x 2
- Slim Type CD / DVD x 1
- 45(H) x 484(W) x 400(D)
- Cooling: 2 x 40mm fans
- Power and HDD indicators
- **Mini-ITX(170mm x 170mm)**
- Power on/off

Firewall/VPN/Telephony/Telecom/VoIP Network/Security/Military Application

Model No.: C1B

- 19" 1U Rackmount
- Internal 3.5" HDD x 1
- Internal 2.5" HDD x 1
- PCI Expansion Slot x 1
- Slim CD-rom/DVD-rom x 1
- **19"(W) x 13"(D) x 1.75"(H)**
- **Mini-ITX(170mm x 170mm)**
- Cooling: 2 x 40x28mm fans
- Power on/off and system reset
- Power, LAN and HDD Indicators

Firewall/VPN/Telephony/Telecom/VoIP Network/Security/Military Application

Model No.: C1E

- 19" 1U Rackmount
- Internal 3.5" HDD x 2
- PCI Expansion Slot x 1
- Slim CD-rom/DVD-rom x 1
- 19"(W) x 14.5"(D) x 1.75"(H)
- Front access USB & LAN ports
- Power LAN and HDD indicators
- **Up to 12" x 9.6" ATX size mobo**
- Power on/off and system reset
- Cooling: 1 x 97mm blower or 2 x 40x56mm fans

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Model No.: 1677

- Color: Black
- Front Port: USB x 2
- Internal 2.5 HDD x 1
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Nano-ITX (120mm x 120mm)**
- Power on/off and system reset
- **82.6mm(H) x 160mm(W) x 163mm(D)**

Home Media Center, Set Top Box, Kiosk, Wireless Media

Model No.: 2677

- Color: Black
- Expansion Slot x 1
- Internal 3.5" HDD x 1
- 4cm Cooling Fan x 2
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **63.5mm(H) x 295mm(W) x 272mm(D)**

Home Media Center, Set Top Box, Kiosk, Wireless Media

Model No.: 2600

- Color: Black
- Expansion Slot x 1
- Internal 3.5" HDD x 1
- 4cm Cooling Fan x 2
- Slim Type CD / DVD x 1
- **63.5(H) x 295(W) x 272(D)**
- **Mini ITX (170mm x170mm)**
- 60W/80W Power Adaptor
- Power on/off and System Reset
- USB x 2, Audio x 1, Mic x 1, 1394 x 1, IR Module (Optional)

Set Top Box, Thin Client, Car Entertainment, Smart Mini PC

Model No.: 3677

- Front Port: USB x 2
- Internal 2.5" HDD x 1
- 6cm Cooling Fan x 1
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **65mm(H) x 210mm(W) x 275mm(D)**

Set Top Box, Thin Client, Car Entertainment, Smart Mini PC

Model No.: 3688

- Front Port: USB x 2
- Internal 2.5" HDD x 1
- 6cm Cooling Fan x 1
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **65mm(H) x 210mm(W) x 258mm(D)**

Stylish Cube Entertainment center

Model No.: 669

- Expansion Slot x 2
- Internal 3.5" HDD x 1
- 4cm Cooling Fan x 2
- External 3.5" HDD x 1
- External 5.25" HDD x 2
- 200W ATX Power Supply
- **Mini-ITX (170mm x 170mm)**
- USB2.0 x 2, 1394/Audio/Mic x 1
- **200mm(H) x 225mm(W) x 330mm(D)**

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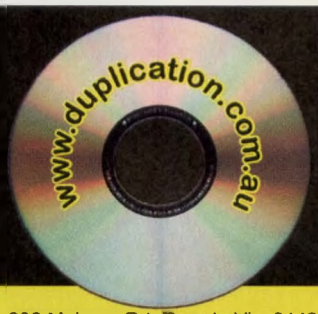

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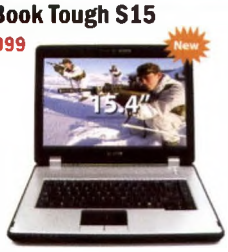

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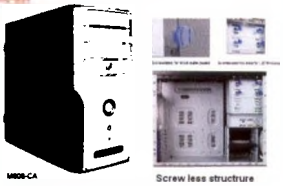

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